IBM-POUGHKEEPSIE
December 31, 1964

Diagnostic Engineering Publication

1410/7010

Subject: Diagnostic Program TC50C
1410/7010 Diagnostic Tape Control Program

Sequence Number 005
Replaces TC50B

Modification to TC50B to create TC50C:

1. Correct failure to loop on NOT READY pglin AB30, page 46.
2. Correct error that disabled ability to update on 40K and up systems pglin AC70, page 50.
3. Correct problem caused when entering control card information from typewriter and no SYSTEM CARD information entered pglin AD01, page 51.

Enclosures: 102 Pages
192 Card Deck for CARD ONLY SYSTEMS (as punched by UP51)
8 Cards - Card Loader (1-7) and 1 Core Clear
183 Cards No. 001-183 Data Cards
1 Card Execute Card

Distribution: X 1410
X 7010
Other

TC50

TC50C

1410/7010 DIAGNOSTIC TAPE

CONTROL SYSTEM

12/31/64

CONTENTS OF TC50 WRITEUP AND LISTING

Appendix III Change Cards and Decks - Level Cards

A. Change Card Images

Whenever a program on your master tape is to be patched or deleted, or a new program is to be added to your master tape, a "Change" card image must be created in order to instruct TC50 Update as to what is desired.

Normally, it will not be necessary for these cards to be created in the field, since any program changes supplied by Diagnostic Development will include change card images regardless of whether the changes are supplied via card decks or via card image tape format.

However, the "Change" card images will contain:

Column 1	X	-to indicate a change card
Column 2	N	-If to add a new program
	D	-If to delete an old program
	P	-If to patch a present program
Columns 3-5	Will contain the subject program's sequence number. This must agree with the number within the program.	
Columns 6-75	May contain comments	
Columns 76-80	May contain the subject program's identity.	

B. Sequencing of Change Cards and Decks.

An "XN" change card will be the first card of each new program deck. (A load program may or may not be between the XN card and program deck.)

An "XP" change card will be the first card of each set of card patches to any one program.

An "XD" change card will be used to designate the deletion of any program.

All change cards, and their associated decks, must be placed in ascending numerical sequence according to the sequence numbers in columns 3-5 of the change cards. Due to space limitations, TC50 Update cannot check for correct sequencing.

If your changes are in card image format on tape, TC50 Update will handle them via a tape drive.

If you have an "on line" 1402, 1442 or 7223 card reader and the changes are in card deck form, they may be handled through your reader.

If you have no "on line" reader, and your changes are in card deck form, you must use "off line" card to tape equipment to place your card images on tape with odd parity. These changes may or may not be placed on the same tape, and directly following, any configuration control card images you may be adding to your master tape. The last card image placed on this tape must be followed by a tape mark.

C. Level Cards

Most "changes" or "Updates" distributed to the field from diagnostic engineering will cause a change to the "change level" of your master tape. The first card image of all such updates will be an "L" card. This card indicates to TC50 Update the level that this group of changes will place a diagnostic tape at, and it indicates the oldest level a tape may be at and still be logically updated by these changes. (See section 1.01.05.U0 for further information.) Only "level" cards supplied by diagnostic engineering should ever be used.

The "L" card consists of:

Column 1 - L
Column 2 - Blank
Columns 3-6 Oldest acceptable tape level that can be updated by these changes.
Columns 7- Blank
Columns 8-11 New level of a tape after this update

Summaries

INTRODUCTION TO THE TC50 DIAGNOSTIC TAPE SYSTEM

The TC50 program is a combination of a tape search program and a tape update program. This writeup is divided into two corresponding sections plus this introduction to the TC50 system.

The prime objectives of the TC50 System are:

1. Assist in "bringing up" a new 1410/7010 system to the point where diagnostics can be run.

2. Provide an initial master tape that may be used to run some diagnostics without requiring the updating of the tape.

3. Provide rapid access to diagnostic programs.

4. Provide the versatility of "machine configuration control cards "without requiring that they be punched for every program on the tape.

5. Provide a simple and fast means of updating 1410/7010 diagnostic tapes.

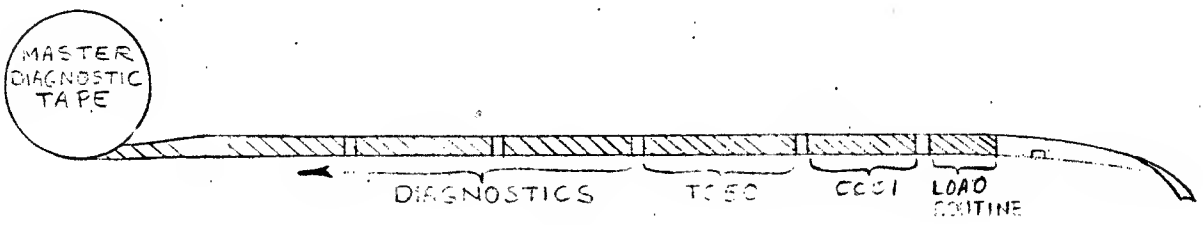
6. Provide for multiple outputs when updating the diagnostic tape.

7. Automatically provide an "Edited" working tape that contains only those programs needed by a particular system, while updating the system's master tape that contains all 1410/7010 diagnostic programs.

8. Provide a means for card/tape systems to obtain card decks directly from their diagnostic tape. (Accomplished through program UP51)

9. Provide a "quick" reliability check of a 1410/7010 machine system.

The Master 1410/7010 diagnostic tape contains programs in "memory dump" form. These "memory dumps" are of program length (not memory length).



The above illustration is to show the contents of a TC50 diagnostic tape. The first record is a short load routine placed there (by TC50) when the tape is created. (This load routine is described in Appendix I of this writeup.) Besides having the function of loading the second record on the tape, the load routine contains some basic tape patterns to assist in diagnosing solid tape read failures.

The second record on the tape is the basic CPU diagnostic CC01. This diagnostic is (automatically) run every time the tape is loaded. All error indications provided by this program are "halts" or "system checks." CC01 also has more extensive tape patterns in it. Upon successful completion, CC01 reads in the third record (TC50), and turns control over to it.

The fourth record, and all succeeding records, are normal diagnostic or utility programs. The last record on the tape is a tape mark.

Updating a TC50 Diagnostic Tape is accomplished through the use of card images. ("Updating" includes creation of a tape, adding or changing the tape's machine configuration control cards, adding programs, deleting programs, and patching programs.) These card images may be provided through a 1402, 1442 or 7223 card reader, or through the use of tape drives.

1.01.00.S TC50 SECTION S (Search Section)

1.01.00.S0 Description

The S, or search section, of TC50 is the program used to locate, load and initiate the running of all diagnostics and other programs contained on the 1410/7010 diagnostic tape.

The search section is designed to make the running of diagnostic programs as fast and easy as possible. The search section cannot be run from cards.

When TC50 is initially loaded, the search section is contained between addresses 01000 and 02000 of core memory. The program is started at address 01972 when initially loaded from tape. It then housekeeps and relocates itself to occupy memory locations 00334 through 00999. The S section is then ready to perform its functions.

At the request of the operator, the S section will initiate a single selected program, a group of selected programs, or all programs on the tape starting at a previously selected program.

TC50 Search also provides an operating option wherein portions of certain programs will be automatically run in a quick mode in order to provide a fast reliability check of a 1410/7010 system. These programs are designated by the diagnostic engineering department. They will automatically include, for all systems, a portion of a CPU reliability program, the addressing tests of applicable memory programs and a complete system test program. It should be noted that this option is a compromise between a thorough and a fast reliability check. The time required to run this complete option will vary according to the system machine configuration. However, for most systems, it should be less than seven minutes.

TC50 Search also provides limited information and closed subroutines for the use of diagnostics on the TC50 tape. It makes available an indicator to allow a diagnostic to know if it is being run from cards or tape. It provides the channel that TC50 Search was loaded from. It has closed subroutines to allow a diagnostic to space or backspace the TC50 source tape.

In order to initiate the running of the TC50 U, or Update, section from the 1410/7010 diagnostic tape, TC50 must be selected for running via the TC50 S section options.

A flow chart of the search section is included in this writeup.

1.01.00.S1 Equipment Required

A 1410 or 7010 machine system with tapes on channel E, F, G or H.

1.01.00.S2 Card Deck (Entire TC50 Program deck)

7	Cards	Load Program
1	Card	Core Clear Card
183	Cards	Program
	(Cards numbered 001 -180)	
1	Card	Execute Card (Branch to 2000)

1.01.00.S3 Machine E. C. Level

Not Applicable

1.01.00.S4 Pass Length

Variable

1.01.01.S0 Loading Procedures

1. Make a TC50 diagnostic tape ready on tape drive 0 of any channel.

2. If a 7010 load button is being used, and the tape is on channel E:

   Depress the tape load switch

   Otherwise:

   (a) Display memory location 00000.

   (b) Alter to:

RL%B000011$.	For E channel tape
XL⊟B000011$.	For F channel tape
3L?B000011$.	For G channel tape
1L!B000011$.	For H channel tape

3. Set to RUN,, COMPUTER RESET, START

The above procedures will load a very short load routine. This load routine will load CC01. Upon successful completion, CC01 will load and initiate the search section of TC50. Appendix I of this writeup contains a description and listing of the short load routine that is the first record of the TC50 diagnostic tape.

1.01.02.S0 Operating Procedures

Upon initial loading, and upon the completion of any selected option, TC50 Search will type: OPTION?

At this time use the inquiry button to enter one of the following:

1. *Program identity, i.e."CU01". Designated program will be run in it's entirety.

or 2. *Left portion of a program identity.
All programs having the designated portion of the identity, that are adjacent on the tape, will be run in their entirety. i.e., if "C" were entered, all programs with a "C" identity would be run; if "CU" were entered, all programs with a "CU" identity would be run; if "CU0" were entered, all programs with a "CU0" identity would be run; etc.

or 3. Nothing (Just request / release)
All programs on the tape will be run in sequence starting at the point the tape is located when this entry is made.

or 4. $
Entering a dollar sign will select the reliability mode described in section 1.01.0C.S0 of this writeup.

* NOTE: Normally when a program identity or a portion of a program identity is entered, the diagnostic tape is rewound before the search of the tape is started. If a word mark is entered along with the first character of the identity, this rewind will be inhibited.

1.01.03.S0 Operating Hints and Comments

The operation of the search section of TC50 requires very little knowledge of the program. Knowing the various options available should be sufficient.

You should be cautioned that upon the completion of any program on the tape, TC50 Search must necessarily read in the next record to determine if a "multi pass" program is being run. The tape will then be backspaced one record to resume its normal position. However, this destroys the just completed program in core memory. In order to re-run the program, it must be re-selected.

If an invalid entry is made in response to the "OPTION?" request the tape will be completely searched for this invalid entry and, failing to locate it, will re-type "OPTION?"

The search section of TC50 contains no halts and a loop condition will result if a machine malfunction is responsible for an I/O status error condition during the execution of tape forward space, backspace or rewind operations.

When a program identity is entered following the "OPTION?" request, the entered data is read into address 00963.

1.01.04.S0 Program Stops and Restarts

There are no programmed halts in TC50 Search. If a data check is encountered while attempting to read in a program, TC50 will backspace and read repeatedly until the record is read without error, or the program is manually halted.

Program Restart Locations

(a) *00334

Starting at this address will cause OPTION? to be typed. This restart address will simulate the reloading of TC50 Search providing locations 00334 - 00999 have not been disturbed since TC50 Search was last loaded.

(b) * 00400

This is the address all programs must go to when complete. Restarting here will simulate the end of a diagnostic test.

(c) * 02000

This is the starting address of all diagnostic programs.

* Note:

These addresses will be different in the case of some memory diagnostics due to the fact that the memory diagnostics must relocate TC50 in order to check the lower portion of core memory.

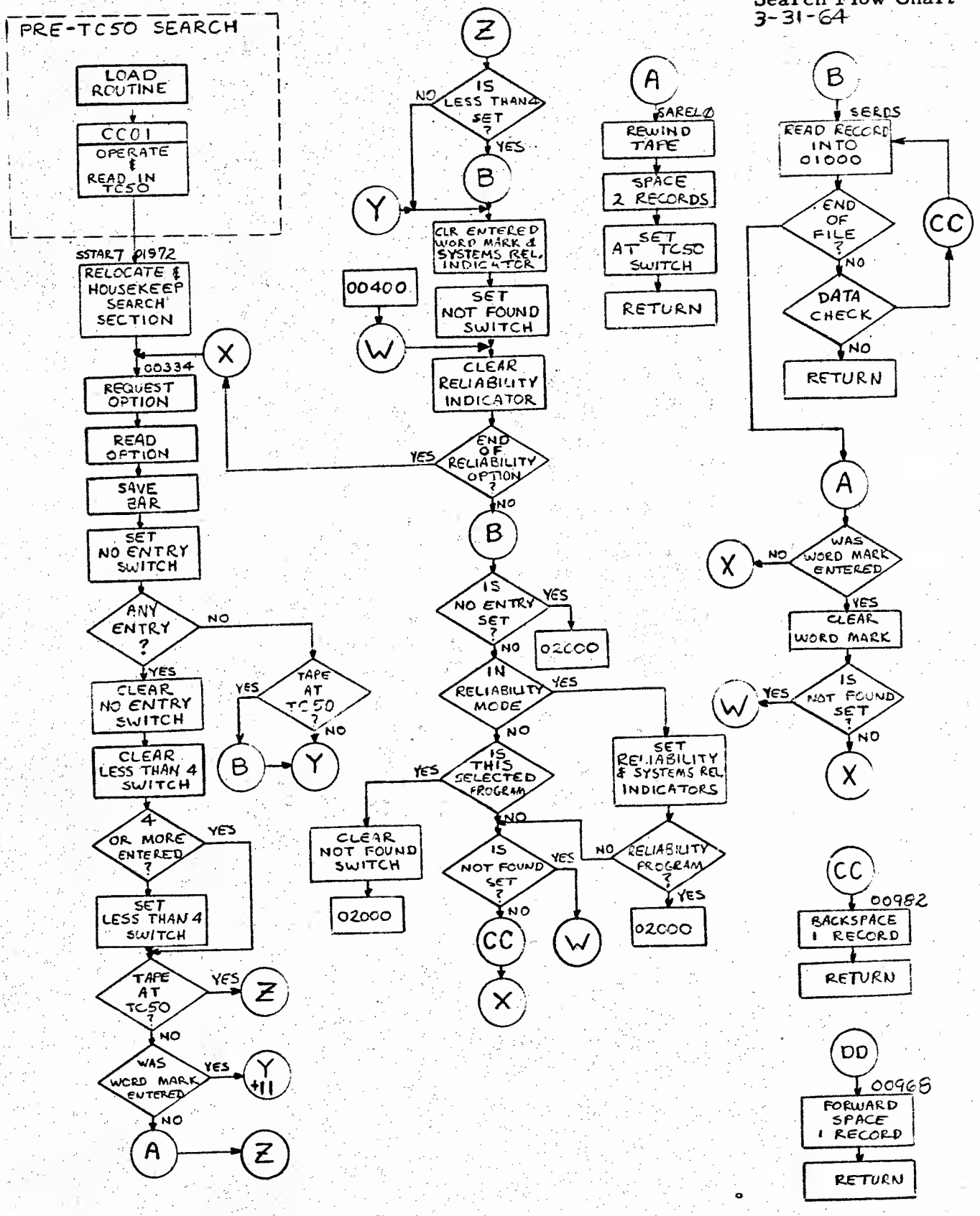
1.01.05.S0 Typeouts

OPTION?

This is the only typeout provided by TC50 Search. It is a request that an option be selected as explained in section 1.01.02.S0.

1.01.06.S0

TC50
Page 012
Search Flow Chart
3-31-64



1.01.00.U TC50 SECTION U (Update Section)

1.01.00.U0 Description (ALSO REFER TO PAGE 034)

The U, or Update, section of TC50 is the program responsible for creating and maintaining all TC50 diagnostic tape systems. The U section is capable of adding, replacing and patching programs on an already existing diagnostic tape. It can create a tape from card image programs. It will selectively place configuration control card images in programs requiring them. The Update section is capable of furnishing an updated master tape output containing all 1410/7010 diagnostics and an updated working tape containing only the programs required by a specific machine configuration. It is capable of performing most of these options during a single run of the program. All outputs of TC50 Update are in a "short memory dump" form. The dumps are created by moving the program to be written to the top of memory, and then performing a WTBEW instruction.

An operation of TC50 Update consists of up to four phases. "Pre-Phase" is the first one to operate. It does all the housekeeping of itself and the other three phases prior to the actual update operation. It occupies the majority of the 9000 memory locations that TC50 is allocated.

Phase 1 (2nd phase) is responsible for combining input card images and input memory dumps. It also stores, into the TC50 program, any new configuration control cards read during pre-phase operation. The output of phase 1 is a tape containing memory length core dumps.

Phase 2 (3rd phase) is responsible for selectively updating the configuration control card images of all programs on the tape (except TC50). Its input consists of short or long memory dumps. Its outputs are from 1 to 20 tapes containing program length (short) memory dumps.

Phase 3 (4th phase) is responsible for producing an edited working tape. It selectively deletes programs not required by a particular machine configuration. Its input is normally a master diagnostic tape of "short" memory dumps. Its output is one tape containing the desired programs in "short" memory dump form.

Phases 1, 2, and 3 occupy only locations 00001 through 00999 while they are operating.

Upon initial loading, pre-phase asks several questions of the operator. The answers are inserted by means of the inquiry request button. Pre-phase then determines, from the answers received, which phases are required for this operation and modifies the program accordingly. Pre-phase also reads any new configuration control cards available, and stores them in lower memory to make them available for phases 1 and 2.

When a straight duplication is being performed (no program changes, no control card changes, and no program editing), Pre-Phase combines phases 1 and 2 to create a single phase duplication program that can provide up to 20 output tapes from a single input tape.

When an "Edit" pass is called for with no program changes and no control card changes, Pre-Phase combines phases 2 and 3 to create a single phase edit program that will provide a single edited output tape from a master input tape.

The memory dump inputs and outputs to TC50 Update may be on any tape selections on any of four channels. TC50 Update is capable of utilizing up to 23 tape drives on a single program run. However, the maximum number of tape drives required for any type of operation is 3. A straight duplication or auto edit run requires only 2 tape drives.

The card image inputs to TC50 Update may be from a card reader (1402, 1442 or 7223) or from any tape drive on any of four channels.

1.01.00.U1 Equipment Required

1410 or 7010 with the following minimum number of I/O devices:

2 tape drives -
Straight duplication or straight edit runs.

3 tape drives -
Any operation requiring only the card image changes pre-written on tape by diagnostic development.

3 tape drives and "off line" card- to-tape equipment-
or
3 tape drives and an "on line" card reader
(1402, 1442 or 7223). -
- Any operation.

1.01.00.U2 Card Deck (Entire TC50 Program Deck)

7	Cards	Load Program
1	Card	Core Clear Card
183	Cards	Program
(Cards numbered 001 - 183)		
1	Card	Execute Card (Branch to 2000)

1.01.00.U3 Machine E. C. Level

Not Applicable

1.01.00.U4 Pass Length

Variable, but should average less than 5 minutes in the field and should seldom exceed 10 minutes for any operation including creation of a tape.

1.01.01.U0 Loading Procedures

1.01.01.U1 Loading from a card deck:

1. Ready a TC50 card deck in a 1402 or 1442 card reader.
2. If using an E channel reader on a 7010 - Depress the card load switch.

   Otherwise -

   Display and alter memory location 00000 to:

ŘŘL%1100011$Ř	For channel 1 reader
ŘŘL⊟1100011$Ř	For channel 2 reader

3. Set to RUN, RESET, START.

1.01.01.U2 Loading from a TC50 tape:

1. Load TC50 Search as explained in section 1.01.01.S0.
2. When "OPTION?" is typed, enter "TC50".

1.01.02.U0 Operating Procedures (Creating, modifying or duplicating a TC50 Diagnostic Tape.) ALSO SEE PAGE 034 for illustration

1.01.02.U1 Preparation prior to machine time.

1. If configuration control card information is to be added or modified, prepare the card images as explained in Appendix II of this writeup. (Once a system's Master TC50 Diagnostic Tape contains the proper control card images, they need never be added again unless the system machine configuration is changed or the TC50 Program is replaced.)

2. If any programs are to be patched, added, or deleted, prepare the "change" card images and program deck card images as explained in Appendix III of this writeup.

1.01.02.U2 Machine set up.

1. Ready a TC50 card deck in a 1402 or 1442 reader or ready a TC50 Diagnostic Tape on any tape drive 0.

2. If configuration control cards are to be added or modified, place the new card images in the reader (1402, 1442 or 7223), or on any tape drive. (If limited to 3 tape drives, see NOTE on next page.)

3. If card image patches, additions, or deletions are required, place these card images in the reader (1402, 1442 or 7223) or on any tape drive . (If limited to 3 tape drives, see NOTE on next page.)

4. If a TC50 Diagnostic Tape is being duplicated, modified, or edited, make it ready on any tape drive. (If running from tape, this may or may not be the tape on drive 0 that has already been made ready.)

5. If this operation is other than a straight duplication and is not an "edit" run, make a scratch tape ready on any drive for use as a buffer tape.

6. Make all output tapes ready. (If limited to 3 tape drives, see NOTE below.)

   (a) For any operation other than an "edit" run, this may be from 1 to 20 drives.
   (b) For an "edit" run with no control card changes or program changes, 1 output drive is required.
   (c) For an "edit" run with control card changes or program changes, 2 output drives are required.

NOTE: If limited to 3 tape drives and "control card" and or "change card" image inputs are from tape: Configuration control card images, change card images and one output drive may all utilize the same physical tape drive since none of these are referred to simultaneously by TC50 Update. (In the case of 6. (c) above, the second output tape drive selection entered is the tape drive that may be used for the 3 different purposes.)

7. If using a 7223 reader for control card and/or card image inputs, place a blank card on the back of the input decks.

1.01.02.U3 Operation

1. Load TC50

2. Some of the following questions will be typed by TC50, Use the inquiry request button to enter the correct answers.

   (a) CORE SIZE? 0-10K, 1-20K, 3-40K, ETC. Enter the core memory size of the system being operated on as follows:

"0" - 10K	"5" - 60K
"1" - 20K	"7" - 80K
"3" - 40K	"9" - 100K

(b) CONTROL CARD SOURCE?

If no configuration control card changes-
request / release.

If control cards are in a card reader -
Enter "EC" or "FC" for a 1402 or 1442
on E or F channel respectively. ("EZ" or "FZ"
for a 7223 reader.)

If control cards are on a tape drive -
Enter "E" or "F" or "G" or "H" to indicate
channel, followed by a "tape drive selection
digit". i.e. : "E1","E2", "H3", etc.

If control cards are to be entered from the console
printer -
Enter "ET" and see Appendix IV.

(c) DIAGNOSTIC TAPE SOURCE?

If creating a tape from card images -
request / release.

If duplicating, modifying or editing an existing tape-
Enter "E" or"F" or "G" or "H" to indicate channel,
followed by a "tape drive selection digit". i.e.:
"E0, "E1", "G4", etc. (Usually tape drive 0).

(d) CARD IMAGE SOURCE?

If no card image patches, additions or deletions
are being made -
request/release.

If card images are in a card reader -
Enter "EC" or "FC" for a 1402 or 1442
on E or F channel respectively. ("EZ" or"FZ"
for a 7223 reader.)

If card images are on a tape drive -
Enter "E" or "F" or "G" or "H" to indicate
channel, followed by a "tape drive selection
digit". i.e. : "E1", "E2", "F5", etc.

(e) AUTO EDIT? Y/N

If an "edited" working tape is desired, enter "Y" for yes.

If a straight duplication is desired or no "edited" working tape is desired, enter "N" for no.

(f) BUFFER TAPE DRIVE?

Enter "channel letter" and "drive selection digit " of scratch tape to be used as a buffer tape. i.e.: "E1", "E2", "F4", etc.

(g) OUTPUT TAPE DRIVES?

Enter "channel letter" of the first output drive followed by the "drive selection digits" of all output drives on that channel, followed by the "channel letter" of the next channel having output drives, followed by the "drive selection digits" of all output drives on that channel, etc. (Minimum of 1 and maximum of 20 tape drives)

Example: "E569G2H43" entry designates E channel drives 5, 6, and 9 , G channel drive 2 and H channel drives 3 and 4.

(h) 1 OUTPUT TAPES?

Enter a "channel letter" and a "drive selection digit". i.e. : "E2"

(i) 2 OUTPUT TAPES?

Enter a "channel letter" followed by 2 drive selection digits" or a "channel letter" and "drive selection digit" followed by another "channel letter" and "drive selection digit". i.e.: "E27" or "E2F7".

3. After answering one of the output tape questions, the operation will proceed automatically until its completion unless an I/O status indicator is encountered.

4. Input/Output errors:

   (a) If any I/O unit being used should become NOT READY, TC50 Update will loop until the unit is made ready.

   (b) If a DATA CHECK should occur on any read or write operation on any I/O unit, a halt will occur. (This is the only programmed halt in TC50 Update other than the halt at the end of the program.)

      (1) START will attempt a re-read or re-write of the bad data. (If a tape write, a skip operation will preceed the re-write.)

      (2) COMPUTER RESET & START will cause TC50 to attempt to operate without correcting the bad data. CAUTION!

5. Halt with the IAR at 00773 or 00687, program is complete.

1.01.03.U0 Operating Hints and Comments

1. Data Checks and Memory Dump Tapes -
All tape records written by TC50 are in the form of memory dumps. Although depressing START following a "write tape data check" will cause a backspace/skip, due to the length of the records being written, in some cases it could require numerous backspace/skip operations to bypass a bad spot on a tape.

2. Blank Cards and Input Card Images -
TC50 will ignore all blank card image inputs. Therefore blank I. B. M. cards may be used to separate card decks being read by TC50.

3. NEVER use a 10K or 20K system to create, duplicate or update a TC50 Diagnostic Tape that is to be used by a system with a larger memory than 10K or 20K respectively. Programs too large to fit in a 10K or 20K memory are automatically deleted during any type run since they cannot be properly written on tape.

4. If you have a 10K or 20K system, and its memory size is increased, be sure and obtain a new master tape containing all current programs, since your current master tape does not contain any programs larger than your old memory.

5. Load Cards may or may not be on card decks as they are being added to your tape during an update operation. They will be ignored by TC50 Update.

1.01.04.U0 Program Stops, Loops and Restarts

1.01.04.U1 Program Stops

IAR at 00408

A data check occurred on the last I/O operation. The data check indicators are still on.

(a) If tape operation -
- to attempt to correct error by repeating the read or write operation, depress START. A backspace/read or a backspace/skip/write operation will result.

-to attempt to continue without correcting the bad data, COMPUTER RESET and START. CAUTION.

(b) If card reader operation -
-if bad card, correct card, make reader ready and depress START.

-if card reader error, replace card in reader hopper, make reader ready, depress START.

-to attempt to continue without correcting the bad data, COMPUTER RESET and START. CAUTION.

IAR at 00773

Completion of an Update run

IAR at 00687

Completion of an Edit or Update / Edit run.

1.01.04.U2 Program Loops

If any tape drive or card reader being used by TC50 Update becomes not ready, TC50 Update will hang in a tight "not ready" loop until the associated I/O device is made ready.

1.01.04.U3 Program Restarts

1. If an operator error is made during a TC50 Update operation that causes any kind of loss of control, it is recommended that the TC50 program be reloaded.

2. If further TC50 Update operations are desired after completion of a TC50 Update operation, it is necessary to reload the TC50 program.

3. At the completion of an Edit or Edit/Update run, you may:

   (a) File protect the new edited tape

   (b) Make its drive ready and change its selection to 0.

   (c) COMPUTER RESET, START

   The new edited tape will be placed in operation.

1.01.05.U0 Typeouts

CARD IMAGE ERROR -FIXIT

1. An illegal, unexpected card image was read.

or 2. You indicated the card image source I/O unit incorrectly.

INVALID CARD IMAGE

1. Expected to read at least one configuration control card image, but first card image read was a "change" card,

or 2. An illegal, unexpected card image was read,

or 3. You indicated the configuration control card source I/O unit incorrectly.

As OUTPUT TAPES are being created, TC50 Update will type the sequence numbers and identities of the programs that are being written on the output tapes.

* LEVEL ERR

The changes now being made to your diagnostic tape were not meant to be made to a tape at the change level your present tape is at. Your present tape is either missing some previous changes, or your present tape is already at a level higher (newer) than are the changes you are incorporating.

OLD - XXXX
NEW - XXXX
These typeouts indicate the change level of your old (source) tape, and the new tape(s) you are now creating. The X's should be four digit numeric numbers. (The higher the number, the newer the level.)

Zone bits in the 1000's position of the "old" level indicate that at some prior time, an update was skipped.
Zone bits in the 100's position of the "old" level indicate that at some prior time an update was made to your tape that took it backwards.

Zone bits in the corresponding positions of the "new" level, but missing from the "old" level, indicate you are now making said error. It would be advisable to stop the present operation, and obtain the proper tapes.

All other typeouts are explained in the "Operating Procedures" section 1.01.02.U0.

1.01.06.U0 Restrictions On System Programs

The restrictions below apply to all programs that are to be placed on a TC50 Diagnostic Tape.

1.01.06.U1 Memory Residence Area

All programs, upon initial loading, will occupy no memory locations outside of addresses 01000 through 39999.

1.01.06.U2 Program Starting Address.

All programs will have address 02000 as their initial operating address.

1.01.06.U3 Restricted Memory Areas

No program will, during its operation, alter addresses 00334 through 00999.

1.01.06.U4 Initial Memory Contents

No program can, when initiated, assume any area outside of its residence area to be cleared, or expect it to contain any pre-determined information except as stated in section 1.01.07.U0 of this writeup.

1.01.06.U5 Program Exit Address

All programs, upon completion, will return to address 00400.

1.01.06.U6 Execute Cards

All execute cards included in a program deck (except the final "branch control" card), will assume they are loaded into address 00601 for operation, and, to continue loading, will return to address 00400.

1.01.06.U7 Final Execute Card (Branch Control Card)

The Final Execute Card will normally consist of a branch to 02000. In addition, it will have an "*" punched in the proper column so that upon being read into address 00601 in LOAD mode, the asterisk will occupy address 00672 of core memory.

1.01.06.U8 Core Clear Execute Card

The Core Clear card preceeding card 001 of each deck must conform to the specifications laid out in the 1410/7010 INTRODUCTION.

1.01.06.U9 Required Internal Data

All programs are required to contain, in the designated addresses, the data described in the following paragraphs.

01250-01255

In this area shall be the program's identity followed by a group mark/word mark. i.e., "CU01A‡".

01250 & 01254 may or may not contain word marks.

01251 - 01253 must not contain any word marks

01245-01249

Word Marks

Location 01245 may or may not contain a word mark. However, it may be changed by TC50 Update as the program is placed on the tape.

Locations 01246 - 01249 must not contain any word marks.

Zones

01246 Zone

- If A Bit-Systems Test

01247 Zone

- If B bit - Program belongs to the reliability group.

- If A bit - Program is TC50.

01248 Zone

- If B bit - Program requires System, Channel 1 and Channel 2 configuration control cards and no channel 3 or channel 4 control cards.

- If A bit - Program requires System, Channel 1, Channel 2, Channel 3 and Channel 4 configuration control cards.

01249 Zone

- If B bit - this program is required by all 1410/7010 tape systems. (Program cannot be "auto edited" from tape.)

- If A bit - Program requires System configuration control card and no channel configuration control cards.

Numerics

01245-01247 Numerics

These three locations will contain the program's relative sequence number as assigned by Diagnostic Development.

01248-01249 Numerics

These two locations will contain the "last thousand's" digits of the program. i.e., If the programs last address was 27431, "27" would be placed in 01248-01249. This would cause 01000-27999 to be included in the core dumps of the program.

01215-01244

This area is reserved for the programmer to tell TC50 Update, Phase 3, what systems his program is applicable to. All programs not having a B bit in location 01249, must have some coded information in this area.

How much of the area is required depends on what type systems the program is applicable to. The coding of this area starts at the right (address 01244) and continues to the left in 3 address blocks. The last address of the last block to the left will contain a word mark. Any addresses to the left of that word mark may be used in any manner by the program.

The explanation of the methods of coding this area starts on the next page.

MEMORY SPACE MUST BE ALLOCATED IN YOUR PROGRAM FOR ANY CONFIGURATION CONTROL CARDS REFERRED TO BY THE CONSTANTS IN THIS AREA. Refer to the 1410/7010 Introduction for Control Card space allocation.

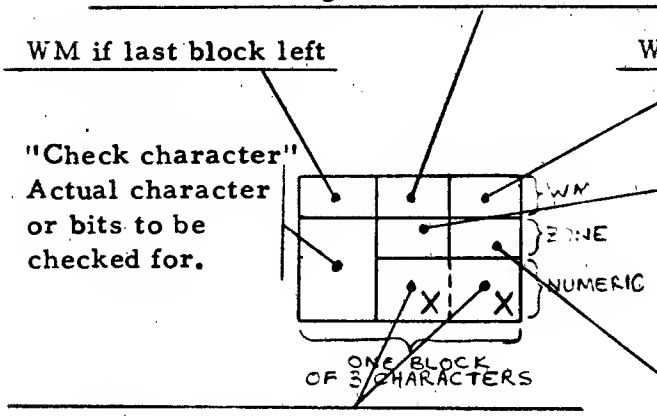
Also, the zone bits in addresses 01248 - 01249 must indicate your program requires these Control Cards.

The figure below is a representation of the coding of an individual block of information.

WM to place ")" between this block's check character and sign and "(" between this block's sign and the next block right.

WM if last block left

WM to cause check with "BBE" instead of "BCE"



$\overline{A}\overline{B}$ Zone = "a." condition
$\overline{A}B$ Zone = "a+" condition
$A\overline{B}$ Zone = "$\overline{a}$." condition
AB Zone = "$\overline{a}$+" condition

$\overline{A}\overline{B}$ Zone and XX>32 = (XX-33) is relative to Chn 1 label
$\overline{A}\overline{B}$ Zone and XX<32 = (XX) is relative to Sys 1 label
$\overline{A}B$ Zone = XX is relative to Chn 2 label
$A\overline{B}$ Zone = XX is relative to Chn 3 label
AB Zone = XX is relative to Chn 4 label

2 digit number specifying position of control card to be checked. For channel one card, add 33 to relative position. (Sys 1 + 0 = 00, Chn 1 + 20 = 53, Chn 2 + 2 = 02, Chn 4 + 55 = 55, etc.)

The methods of using this figure to code a programs "Edit Constants" are explained on the following pages by means of proceeding through an actual example.

We will assume a theoretical program. The assumed theoretical program requires a machine configuration, as follows, in order to properly operate.

The machine must have a memory size of 10K. It must be a 1410 (not a 7010) with a card reader of any kind on channel one,

or

it may be a 7010 with a card reader on Channel 2.

To put this another way:

(10K memory and not 7010 and reader channel 1) or
(7010 and reader channel 2)

This may be coded as a Boolean expression:

$(a \cdot \overline{b} \cdot c) + (d \cdot e)$

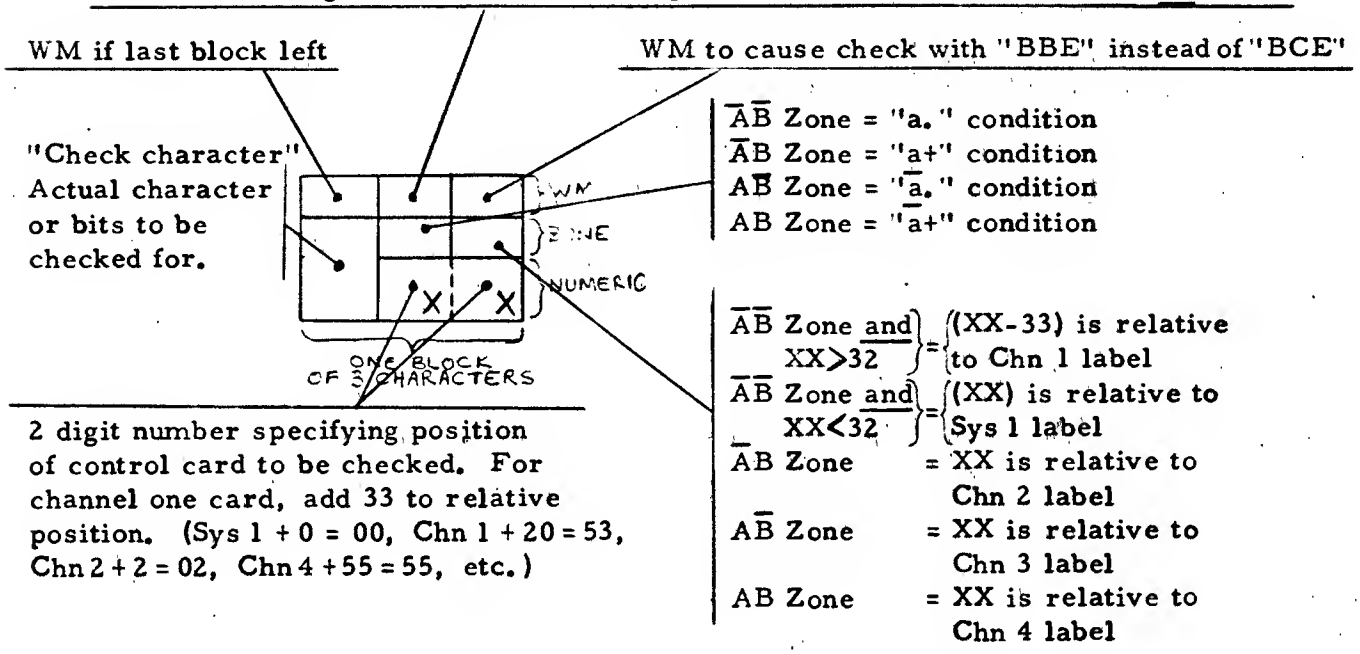
Where:
- a = 10K memory
- $\overline{b}$ = not 7010
- c = reader on channel 1
- d = 7010
- e = reader on channel 2
- . = "and" sign
- + = "or sign

In coding this information, these characters, signs and parentheses will be represented in 3 address blocks:

- e. by addresses 01242 - 01244
- d. by addresses 01239 - 01241
- c)+(by addresses 01236 - 01238
- b. by addresses 01233- 01235
- a. by addresses 01230 - 01232

The parentheses on both ends are assumed.

The figure below is a representation of the coding of an individual block of information.



The methods of using this figure to code a programs "Edit Constants" are explained on the following pages by means of proceeding through an actual example.

We will assume a theoretical program. The assumed theoretical program requires a machine configuration, as follows, in order to properly operate.

The machine must have a memory size of 10K. It must be a 1410 (not a 7010) with a card reader of any kind on channel one,

or

it may be a 7010 with a card reader on Channel 2.

To put this another way:

(10K memory and not 7010 and reader channel 1) or
(7010 and reader channel 2)

This may be coded as a Boolean expression:

$$(a \,.\, \overline{b} \,.\, c) + (d \,.\, e)$$

Where:
- a = 10K memory
- $\overline{b}$ = not 7010
- c = reader on channel 1
- d = 7010
- e = reader on channel 2
- . = "and" sign
- + = "or sign

In coding this information, these characters, signs and parentheses will be represented in 3 address blocks:

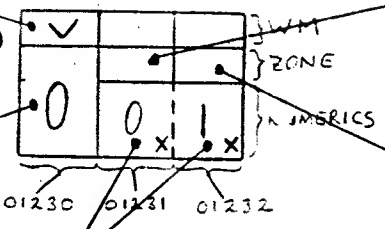
- e. by addresses 01242 - 01244
- d. by addresses 01239 - 01241
- c)+(by addresses 01236 - 01238
- b. by addresses 01233- 01235
- a. by addresses 01230 - 01232

The parentheses on both ends are assumed.

Starting at the left most block (address 01230), and referring to the figure on page 027, the five blocks will be coded as follows:

"WM to indicate this is the last block to the left.

"0" to indicate that TC50 should look for a zero in the control card. (A "0" represents a 10K memory in the system control card.)



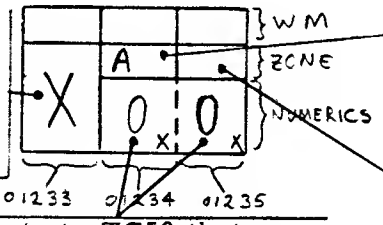
No zone bits to indicate that the Boolean character and sign that this block represents is "a.".

No zone bits to indicate that the control card this block is referring to is either the system control card or the channel one control card. (Memory size is in the system control card.)

"01" to indicate to TC50 that the relative position in the control card to be checked is "card +01". (Memory size is indicated in the first address of the system control card plus one.)

FIRST BLOCK FROM LEFT CODED TO INDICATE A 10K MEMORY IS REQUIRED. "a." in the Boolean expression.

"X" to indicate that TC50 should look for an X in the control card. (An "X" represents a 7010 machine in the system control card.)



"A Bit zone to indicate that the Boolean character and sign that this block represents is "$\bar{a}$.".

No zone bits to indicate that the control card this block is referring to is either the system control card or the channel one control card. (Machine type is the system control card.)

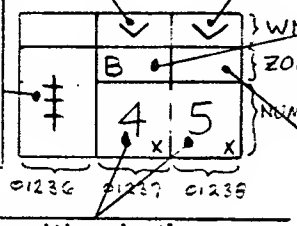
"00" to indicate to TC50 that the relative postion in the control card to be checked is "card + 00". (Machine type is indicated in the first address of the system control card.)

SECOND BLOCK FROM LEFT CODED TO INDICATE THE MACHINE REQUIRED IS NOT A 7010. "$\bar{b}$." in the Boolean expression.

"WM" to cause the Boolean expression to be broken into two terms, at this point, by parentheses.

"WM" to cause TC50 to check the control card character with a "Branch Bit Equal" instruction instead of a "Branch Character Equal" instruction. (Any bit in the reader position indicates a reader is present.)

"‡" to indicate character TC50 should look for in the control card. (A reader is indicated by several different characters in the channel one control card. Therefore, the presence of any bit in the reader position would indicate a reader of some kind is present.)



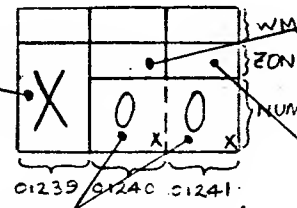
"B Bit" zone to indicate that the Boolean character and sign that this block represents is "a+".

No zone bits to indicate that the control card this block is referring to is either the system control card or the channel one control card. (Channel one reader is indicated in the channel one control card.)

"45" to indicate the relative position in the channel one control card to be checked is channel one card plus 12. (A reader is indicated by a character in the first address plus 12 of the channel one card. "33" must be added to the "12" since this block refers to the channel one control card.)

THIRD BLOCK FROM LEFT CODED TO INDICATE A READER IS REQUIRED ON CHANNEL ONE AND TO INDICATE THAT THIS IS THE END OF THE FIRST TERM OF A TWO TERM BOOLEAN EXPRESSION. "c) + (" in the Boolean expression.

"X" to indicate that TC50 should look for an X in the control card. (An "X" represents a 7010 machine in the system control card.)



No zone bits to indicate that the Boolean character and sign that this block represents is "a.".

No zone bits to indicate that the control card this block is referring to is either the system control card or the channel one control card. (Machine type is in the system control card.)

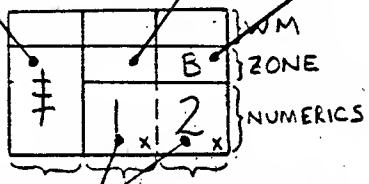
"00" to indicate to TC50 that the relative position in the control card to be checked is, "card +00". (Machine type is indicated in the first address of the system control card.)

FOURTH BLOCK FROM LEFT CODED TO INDICATE A 7010 IS REQUIRED. "d." in the Boolean expression.

"‡" to indicate character TC50 should look for in the control card. (A reader is indicated by several different characters in the channel two control card. Therefore the presence of any bit in the reader position would indicate a reader of some kind is present.)

No zone bits to indicate that the Boolean character and sign that this block represents is "a.".

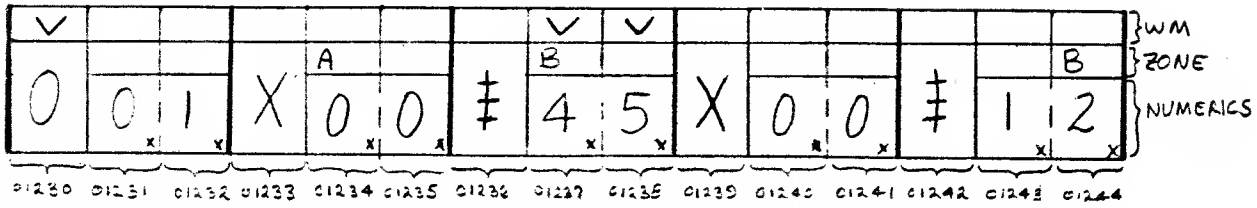
"B Bit" zone to indicate that this block is referring to the channel two control card. (Channel two reader is indicated on the channel two control card.)



"12" to indicate the relative position in the control card to be checked is "card + 12". (A channel two reader is indicated by a character in the first address plus 12 of the channel two control card.)

FIFTH BLOCK FROM LEFT(LAST BLOCK) CODED TO INDICATE A READER IS REQUIRED ON CHANNEL TWO. "e." in the Boolean expression.

The total coding of the five blocks - -



- - can be converted to actual character coding:

v v v
001 X ‡ 0 ‡ M 5 X 0 0 ‡ 1 K

This data would, as stated earlier, occupy addresses 01230 - 01244.

A program's coding must have a minimum of one block of information (unless 01249 contains a B bit) and a maximum of ten blocks of information.

A program's coding can not have more than two terms. i.e., $(a \cdot \bar{b} \cdot c) + (d \cdot e)$ is two terms. $(a + b + c + d + e) \cdot (f + g +)$ is two terms. $(a + b +)$ is one term.

Although the sign of the last block to the right is meaningless in the Boolean expression, it must be present as a result of the method of coding. For uniformity, it is normally made the same as the sign of the next to the last block to the right.

1.01.07.U0 Inter-Program Communication

1.01.07.U1 Information available to system programs.

Addresses 00998 - 00999

- 00999 will contain a word mark if a program was loaded from a TC50 tape. 00999 will not contain a word mark if a program was loaded from cards.

- If a word mark is in 00999, the characters in 00998-00999 will be :

% R	if source tape is on channel 1
□ X	if source tape is on channel 2
? 3	if source tape is on channel 3
! 1	if source tape is on channel 4

Address 00997

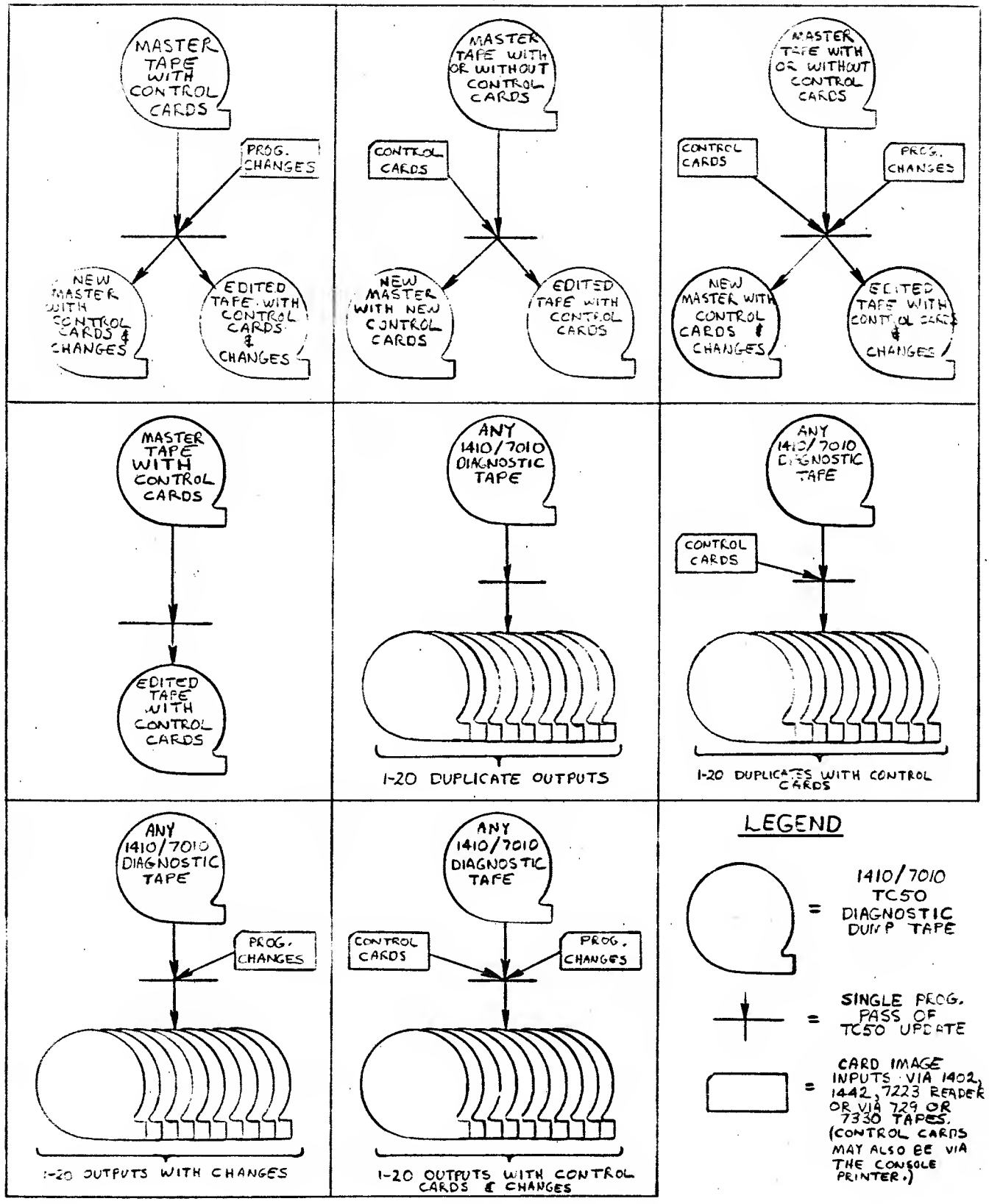
- Will contain a word mark when the "Reliability Option" has been selected for running. Otherwise it will not contain a word mark.

1.01.07.U2 Closed subroutines available to diagnostics. (Only when 00999 contains a word mark)

Branch to 00968
Forward space diagnostic source tape one record.

Branch to 00982
Backspace diagnostic source tape one record.

8 VARIATIONS OF A TC50 UPDATE PROGRAM PASS



Appendix I TC50 Load Routine

Whenever a TC50 Diagnostic Tape is created, duplicated or updated, the first record of the new TC50 Diagnostic Tape is a short load routine. This load routine is automatically created by TC50 Update. The listing below is the actual load routine record that is on all TC50 Diagnostic Tapes. Note that the last portion of the record consists of three type tape patterns to assist in basic tape system debugging. (The first portion of the CC01 record has more extensive tape patterns.)

Address If Load Button	Address Otherwise	Instruction	
00001	00011	W00123000016	Go if Load Button
00013	00023	D00000000717	Set Up Tape Read
00025	00035	D00000000887	
00037	00047	D00000000957	
00049	00059	D00002000793	
00061	00071	R00078#	
00068	00078	L%B001000$	Read CC01
00078	00088	R000783	
00085	00095	R00102#	
00092	00102	D0008800332X	Save Channel Info
00104	00114	D0008700331X	
00116	00126	J02000b	Go to CC01
00123	00133	R00130#	
00130	00140	L%B001000$	Read CC01

00140	00150	ˇR001303	
00147	00157	ˇR00154‡	
00154	00164	ˇD0014000332X	Save Channel Info
00166	00176	ˇD0013900331X	
00178	00188	ˇJ02000b	Go to CC01
00185	00195	ˇ.	
00186	00196	12124248488b-b-b-blb	Floating Bits
00207	00217	<mGFm<<mFGm<<m$GF	Floating Not Bits
00228	00238	ˇˇˇˇˇˇ 1248b-b	Word Marks
00235	00245	m m	Word Seperators

Appendix II — Preparation Of Configuration Control Card Images

All tape installations must initially prepare one set of configuration control card images. (Card Only systems refer to 1410/7010 Introduction). You will never have to do this again unless:

(1) Your system machine configuration changes.
or (2) You damage your master tape and must replace it.
or (3) You replace your TC50 program on your master tape.

One complete set of configuration control card images consists of one "system control card image"; and one "channel control card image "for each channel your machine has. i. e.; If you have a one channel system, you need a system control card and a channel one control card. If you have a three channel system, you need a system control card and a channel one control card, and a channel two control card, and a channel three control card. etc.

Most diagnostic programs refer to the information punched in these control cards to determine what equipment is available for use or for checking. The card images you prepare will be placed on your Master TC50 Diagnostic tape in TC50, and in all diagnostics requiring them, by TC50 Update.

This information is also used by TC50 Update during an "Edit " operation.

Determine which configuration control cards your master tape requires, and punch the cards as follows:

Columns 1 - 4

SYS1	for System Control Card
CHN1	for Channel 1 Control Card
CHN2	for Channel 2 Control Card
CHN3	for Channel 3 Control Card
CHN4	for Channel 4 Control Card

Columns 5 - 12
- will be blank for all control cards.

Columns 13 - 69
Punch your machine configuration information as directed in Appendix I of the 1410/7010 Introduction.

Columns 70 - 80
- may be blank or may contain comments as desired.

If you have a card reader (1402, 1442 or 7223), your Configuration Control Cards are ready to be placed on your Master tape.

If you have no card reader on your system, use card to tape equipment to place your control cards on tape with odd parity. Following the control cards on the tape must be either a tape mark, or a "change" card. (Change cards are required only if you are adding, deleting, or patching programs on your master tape. Any required change cards may or may not be on the same tape as the Configuration Control Cards. Change cards are explained in Appendix III of this writeup.)

If you prefer to enter your configuration control card information via the console printer, refer to Appendix IV of this writeup. Whenever possible, control card information should be entered via card images to reduce the possibility of operator error and to save system time.

Appendix III Change Cards and Decks - Level Cards

A. Change Card Images

Whenever a program on your master tape is to be patched or deleted, or a new program is to be added to your master tape, a "Change" card image must be created in order to instruct TC50 Update as to what is desired.

Normally, it will not be necessary for these cards to be created in the field, since any program changes supplied by Diagnostic Development will include change card images regardless of whether the changes are supplied via card decks or via card image tape format.

However, the "Change" card images will contain:

Column 1	X	-to indicate a change card
Column 2	N	-If to add a new program
	D	-If to delete an old program
	P	-If to patch a present program
Columns 3-5	Will contain the subject program's sequence number. This must agree with the number within the program.	
Columns 6-75	May contain comments	
Columns 76-80	May contain the subject program's identity.	

B. Sequencing of Change Cards and Decks.

An "XN" change card will be the first card of each new program deck. (A load program may or may not be between the XN card and program deck.)

An "XP" change card will be the first card of each set of card patches to any one program.

An "XD" change card will be used to designate the deletion of any program.

All change cards, and their associated decks, must be placed in ascending numerical sequence according to the sequence numbers in columns 3-5 of the change cards. Due to space limitations, TC50 Update cannot check for correct sequencing.

If your changes are in card image format on tape, TC50 Update will handle them via a tape drive.

If you have an "on line" 1402, 1442 or 7223 card reader and the changes are in card deck form, they may be handled through your reader.

If you have no "on line" reader, and your changes are in card deck form, you must use "off line" card to tape equipment to place your card images on tape with odd parity. These changes may or may not be placed on the same tape, and directly following, any configuration control card images you may be adding to your master tape. The last card image placed on this tape must be followed by a tape mark.

C. Level Cards

Most "changes" or "Updates" distributed to the field from diagnostic engineering will cause a change to the "change level" of your master tape. The first card image of all such updates will be an "L" card. This card indicates to TC50 Update the level that this group of changes will place a diagnostic tape at, and it indicates the oldest level a tape may be at and still be logically updated by these changes. (See section 1.01.05.U0 for further information.) Only "level" cards supplied by diagnostic engineering should ever be used.

The "L" card consists of:

Column 1 - L
Column 2 - Blank
Columns 3-6 Oldest acceptable tape level that can be updated by these changes.
Columns 4- Blank
Columns 5-8 New level of a tape after this update

Appendix IV Insertion of Control Cards Via the Console Printer.

If it is desired, you may change, or add, configuration control card information via the console printer instead of via card images.

Prior to your scheduled machine time, write on a sheet of paper all information you require in your control cards columns 13-69, as explained in Appendix I of the 1410/7010 Introduction.

After you enter "ET" during the operation of TC50 Update, TC50 will type:

ENTER SYSTEM CARD

At this time, use the inquiry request button to enter your pre-determined system control card information for columns 13-45. (If you do not desire to change the present system control card information that is contained on your master tape, just Request/Release.)

When you depress inquiry release, TC50 will type:

ENTER CHAN 1 CARD

Use the inquiry request button to enter your pre-determined channel 1 control card information for columns 13-69. (If you do not desire to change the present channel 1 control card information that is contained on your master tape, just Request/Release.)

Similar requests may be typed for channel 2, 3 and 4 control card information. They should be treated just as explained for channel 1 above.

Should the program request information for a channel that you do not have on your system, just Request/Release.

026

```
PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
AA 1      SCHLOD    EQU    1000          SEARCH LOADING ADDRESS
AA 2      STDIAG    EQU    2000          DIAGNOSTICS RUNNING ADDRESS
AA 3      SDDIAG    EQU    1000          DIAGNOSTICS LOADING ADDRESS
AA 4      SIDENT    EQU    1250          LEFT ADDRESS OF DIAG IDENT
AA 5      RELIA     EQU    1247          RELIABILITY ZONE POSITION
AA 6      FIELD     EQU    1000          LOCATION TO READ PROGRAMS INTO
AA 7      FIELDS    EQU    00997         FIELD ADDRESS -3
AA 8      CAREA     EQU    BPHASE        LOCATION TO READ PHASE 2 INTO
AA 9      PRGSQ     EQU    1247          LOCATION OF PROGRAM SEQUENCE NO.
AA10      TOPTHO    EQU    1249          LOCATION OF TOP THOUSANDS CHARS.
AA11      SYS1      EQU    1256          SYS1 CARD ADDR IN DIAGNOSTIC
AA12      CHN1      EQU    1289          CHN1 CARD ADDR IN DIAGNOSTIC
AA13      CHN2      EQU    1346          CHN2 CARD ADDR IN DIAGNOSTIC
AA14      CHN3      EQU    1403          CHN3 CARD ADDR IN DIAGNOSTIC
AA15      CHN4      EQU    146C          CHN4 CARD ADDR IN DIAGNOSTIC
AA16      PCPU      EQU    2000
AA17      INDEXX    EQU    2,X           3RD INDEX REG FOR PHASE 2 ONLY
AA18      INDEXA    EQU    3,X           IX REG FOR ANYTHING-NOT PH 1
AA19      INDEXB    EQU    4,X           IO ERR RTN AND GENERAL USE
AA20      ********************************************************************
AA21      *SEARCH SECTION OF TAPE CONTROL-THIS SECTION IS RESPONSIBLE FOR
AA22      *FINDING AND LOADING INTO MEMORY THE SELECTED PROGRAMS ON THE
AA23      *DIAGNOSTIC TAPE
AA24                ORG    334                                                      00334
AA25                CORG   SCHLOD                                   01000         00334
AA26      ********************************************************************
AA27      *ROUTINE TO SELECT A PROGRAM FROM DIAGNOSTIC TAPE.
AA28      *STARTING POINT FOR SEARCH SECTION.
AA29      SSTART    WCP    SOPTN         REQUEST OPTION            01000 10  00334  M%T000943W
AA30                BA1    *-16                                    01010  7  00344  R0C334M
AA31      SCRPA     RCPW   SELTST        READ OPTION               01017 10  00351  L%T000963R
AA32                SBR    SPSY          SAVE LAST ADDRESS &1      01027  7  00361  G0C399B
AA33                BEX1   *-23,M        GO ON ANY BUT WLR         01034  7  00368  R0C351M
AA34                BA1    *&1           RESET INTERLOCK           01041  7  00375  R00382M
```

```
   PGLIN     LABEL     OPCCD  OPERAND                                          CT  ADDRS  INSTRUCTION
   AA36      ********************************************************************
   AA37      *WAS ANYTHING ENTEREC.
   AA38                Sw     SNCENT&1          SET NC ENTRY SWITCH            01048  6  00382  ,00598
   AA39                B      SARNDB                                           01054  7  00388  J00407
   AA40                ORG    395                                                     00395
   AA41                CCCRG  1CC1                                             01CC1   00395
   AA42      SPSY      CCW    @     @           BAR AFTER RCP                  01065  5  00399
   AA43                B      SSWW              ENTRY FROM DIAGNCSTIC          01066  7  00400  J00571
   AA44      SARNDB    BCE    SATTC,SPSY,4      GO IF NO ENTRY MADE            01073 12  00407  B00546003994
   AA45                CW     SNCENT&1          CLEAR NO ENTRY SWITCH          01085  6  00419  ¤00598
   AA46      ********************************************************************
   AA47      *CALCULATE NUMBER OF CHARACTERS ENTERED AND MODIFY ACCORDINGLY.
   AA48                Cw     SFCUR&1           CLEAR LESS THAN 4 SWITCH       01091  6  00425  ¤00532
   AA49      SALLTS    MLCA   SCMPAD,SCOMP&1C   INITIALIZE COMPARE CP          01097 12  00431  D00942006331
   AA50                ZA     SRESPL,SRESUL     INITIALIZE SRESUL              01109 11  00443  £0093200927
   AA51                S      SPSY,SRESUL       CALCULATE RESULT               01120 11  00454  S0039900927
   AA52                BZ     SCKTPC            GO IF 4 OR MORE                01131  7  00465  J00500V
   AA53                S      SRESUL,SCOMP&1C   REDUCE                         01138 11  00472  S0092700633
   AA54                S      SRESUL,SCOMP&5                                   01149 11  00483  S0092700628
   AA55                SW     SFCUR&I           SET LESS THAN 4 SWITCH         01160  6  00494  ,00532
   AA56      ********************************************************************
   AA57      *IS TAPE AT TAPE CONTROL RECORD.
   AA58      SCKTPC    BW     SFCUR,SATTC&1     GO IF YES                      01166 12  00500  V00531005471
   AA59      ********************************************************************
   AA60      *LOCATE TAPE AT TC50 IF NOT INHIBITED.
   AA61                Bw     SVSETR&11,SELTST  GO IF WM ENTERED-RWC INHIBITED 01178 12  00512  V00565009631
   AA62                B      SARELO            GO LOCATE TAPE & RETURN        01190  7  00524  J00749
   AA63      ********************************************************************
   AA64      *IF LESS THAN FOUR CHARACTERS ENTERED-LOCATE ONE RECORD PAST TC.
   AA65      SFCUR     NOP                                                     01197  1  00531  N
   AA66                B      SBRDS             GO READ RECORD IF LESS THAN FOUR01198  7  00532  J00795
   AA67      SARNDZ    B      SVSETR                                           01205  7  00539  J00554
```

PGLIN	LABEL	OPCOD	OPERANC		CT	ADDRS	INSTRUCTION
AA69	**********						
AA70	*AT TAPE CONTROL SWITCH.						
AA71	SATTC	NOPWM			01212 1	00546	N
AA72		B	SBRDS	GO READ A RECORD IF AT TC	01213 7	00547	J00795
AA73	**********						
AA74	*LOOK FOR SELECTED PROGRAM						
AA75	SVSETR	CW	SELTST,SYSREL	CLR WM ENTERED/CLR SYS REL IND	01220 11	00554	¤0096300578
AA76		SW	SNOFD&1	SET NOT FOUND SWITCH	01231 6	00565	,00690
AA77	SSWW	CW	SRELIA	CLEAR RELIABILITY INDICATOR	01237 6	00571	¤00997
AA78		ORG	1245		01245	00577	
AA79		DCW	@0CV@	SEQUENCE IS 005	01247 3	00579	
AA80		DC	@0R@	C9 WITH B BIT	01249 2	00581	
AA81	IDENT	ORG	*		01250	00582	
AA82	C	DCW	@IC5CC@,G	IDENTITY	01254 5	00586	
AA83	SWORG	ORG	SSWW66			00577	
AA84	SOORG	ORG	*		01256	00577	
AA85		NOPWM		GO FOR NEW REQUEST IF COMPLETED	01256 1	00577	N
AA86	SYSREL	BBE	SSTART,SRESPL,B S	GO IF RAN SYS TST IN REL MODE	01257 12	00578	W00334009328 S
AA87	SSKPIC	B	SBRDS	GO READ A RECORD	01269 7	00590	J00795
AA88	SNOENT	NOPWM			01276 1	00597	N
AA89		B	STOIAG	GO RUN DIAG.IF NO ENTRY	01277 7	00598	J02000
AA90		BOE	SREPR,SELTST,$	GO IF IN RELIABILITY MODE	01284 12	00605	B00654009635
AA91		SW	SIOENT	SET WM IN IDENT	01296 6	00617	,01250
AA92	SOOMP	C	0,C	SHOULD THIS PROG.BE RUN	01302 11	00623	C0000000000
AA93		BU	SNOFD	GO IF NO	01313 7	00634	J00689/
AA94		CW	SNOFD&1	CLEAR NOT FOUND SWITCH	01320 6	00641	¤00690
AA95		B	STOIAG	GO RUN DIAGNOSTIC	01326 7	00647	J02000
AA96	SREPR	SW	SRELIA,SYSREL	SET REL INDIC/SET SYS REL INDIC	01333 11	00654	,0099700578
AA97		MLZS	01246,SRESPL	STORE ZONE IN CASE SYSTEMS TEST	01344 12	00665	D01246009322
AA98		BBE	STOIAG,RELIA,-	GO RUN IF RELIABILITY PROG	01356 12	00677	W0200001247-
AA99	SNOFD	NOPWM		NOT FOUND SWITCH	01368 1	00689	N
AB		B	SSWW	GO GET ANOTHER IF NOT YET FOND	01369 7	00690	J00571
AB 1		B	SOOENT	BACKSPACE SOURCE TAPE	01376 7	00697	J00982
AB 2		B	SSTART	GO REQUEST A REQUEST	01383 7	00704	J00334

```
   PGLIN     LABEL      OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION

   AB 4      ************************************************************
   AB 5      *CLOSED SUBRCUTINE TC BACKSPACE DIAGNOSTIC SCURCE TAPE.ENTER AT
   AB 6      *LCCATION 00982.
   AB 7      SCCRTN  *  BSP    10                 BACKSPACE TAPE          01390  5  00711  U%U0B
   AB 8              *  BAI    *-11                                       01395  7  00716  R00711M G
   AB 9      SCCEXT     B      0                  RETURN                  01402  7  00723  J00000
   AB10      ************************************************************
   AB11      *CLOSED SUBRCUTINE TC SKIP A RECCRD CN DIAGNOSTIC SCURCE TAPE.
   AB12      *ENTER AT LCCATION 00968.
   AB13       SCCRTN *  CCW    @U%U0A@            SPACE CNE RECORD        01409  5  00730
   AB14              *  BAI    *-11                                       01414  7  00735  R00730M G
   AB15      SCCEXT     B      0                  RETURN                  01421  7  00742  J00000
   AB16      ************************************************************
   AB17      * REWIND TAPE ANC SKIP TWO RECORDS
   AB18      SARELC     SBR    SAREX&5                                    01428  7  00749  G00793B
   AB19      SARWC   *  RWD    10                 REWIND SCURCE TAPE      01435  5  00756  U%U0R
   AB20      SARBA   *  BAI    SARELO             BRANCH ANY              01440  7  00761  R00749M G
   AB21                 B      SCCENT             SKIP 1 RECCRD           01447  7  00768  J00968
   AB22                 B      SCCENT             SKIP 1 RECCRD           01454  7  00775  J00968
   AB23                 SW     SATTC&1                                    01461  6  00782  ,00547
   AB24      SAREX      B      0                                          01467  7  00788  J00000
```

```
   PGLIN     LABEL      OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION
   AB26      ************************************************************************
   AB27      * READ PROGRAM INTO LOCATION 1CCC
   AB28      SBRDS      SBR    SBREX&5          STORE BAR FOR RETURN                    01474  7  00795  G008518
   AB29      SBRRC   *  RTBGW  1C,SCHLOD       READ TAPE                               01481 10  00802  L%B0010008
   AB30      SBRBC   *  BEX1   *-16,3          BRANCH IF BUSY OR NOT READY             01491  7  00812  R008023
   AB31      SBRBE   *  BEF1   *&28            GO IF END OF FILE                       01498  7  00819  R008538
   AB32      SBRERR  *  BER1   SBRERC          GO IF DATA CHK TC TRY AGAIN             01505  7  00826  R009044G
   AB33      SBRBA   *  BAI    *&1              CLEAR I/O INTERLOCK                     01512  7  00833  R0084CM
   AB34                 Cw     SATTC&1          CLEAR TC50 SWITCH                       01519  6  00840  □00547
   AB35      SBREX      B      0                RETURN                                  01525  7  00846  J00000
   AB36                 B      SARELO           BRANCH TO REWIND AND SKIP               01532  7  00853  J00749
   AB37                 Bw     *&8,SELTST       BRANCH IF WM SET                        01539 12  00860  V00879009631
   AB38                 B      SSTART           BRANCH IF NO WM ENTERED                 01551  7  00872  J00334
   AB39                 Cw     SELTST           CLEAR ENTERED WORD MARK                 01558  6  00879  □00963
   AB40                 Bw     SSWW,SNOFD&1     BRANCH IF NOT FOUND SW IS SET           01564 12  00885  V00571006901
   AB41                 B      SSTART           BRANCH IF NOT SET                       01576  7  00897  J00334
   AB42      SBRERC  *  BSP    10               BACKSPACE DIAGNOSTIC TAPE               01583  5  00904  U%U0B
   AB43      SBRERP  *  BAI    *-11                                                     01588  7  00909  R00904MG
   AB44                 B      SBRRC            GO REREAD TAPE                          01595  7  00916  J00802
   AB45      ************************************************************************
   AB46      *SEARCH SECTION CONSTANTS AND STORAGE.
   AB47      SRESUL     CCW    @      @         TEMPORARY STORAGE                       01606  5  00927
   AB48      SRESPL     CCW    SELTST&5                                                 01611  5  00932  00968
   AB49                 CCW    SELTST&3                                                 01616  5  00937  00966
   AB50      SCMPAC     CC     SICENT&3                                                 01621  5  00942  01253
   AB51       SCPIN     CCW    @OPTION@@,G                                              01622  7  00943
```

```
PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
A853      ********************************************************************
A854      *ROUTINE ENTRIES AND DATA COMMON FOR ALL DIAGNOSTICS
A855                ORG    SNWORG&386                                           00963
A856                CCORG  SOCORG&386                              01642       00963
A857       SELTST   DC     a    a,G          OPTION REQUESTED     01642  4    00963
A858      SOCENT    SBR    SOCEXT&S          ENTER HERE TO SPACE TAPE 01647 7  00968  G007478
A859                B      SOCRTN                                 01654  7    00975  J00730
A860      SCCENT    SBR    SCCEXT&S          ENTER HERE TO BCKSPCE TAPE 01661 7 00982  G00728B
A861                B      SCCRTN                                 01668  7    00989  J00711
A862                DCW    a a               SPARE          00996   01675  1    00996
A863      SRELIA    DC     a a               RELIABILITY INDICATOR 00997 01676 1 00997
A864      SCHNNL    DCW    a a               CHANNEL CHARACTER    00998  01677  1    00998
A865      SBAOPC    DCW    a a               BA OP CODE&TAPE WM   00999  01678  1    00999
A866                DCW    aMa               STOP MOVE OF SEARCH SECTION    01679  1    01000
A867      SCCORG    CCORG  *                                      01680       01001
A868      ********************************************************************
A869      *RELOCATE SEARCH PORTION OF TAPE CONTROL
A870                ORG    SCCORG                                               01680
A871      SRELSH    CS     00099             CLEAR INDEX REGISTERS            6  01680  /00099
A872                SW     INDEX8-4                                           6  01686  ,00040
A873                MRCWG  SCHLOD,SSTART     MOVE SEARCH SECTION              12  01692  00100000334LD
A874                MRCWG  SOCORG,SNWCRG                                      12  01704  00125600577LD
A875                MRCWG                                                     1  01716  D
A876                MRCWG                                                     1  01717  D
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   PGLIN     LABEL      OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION

   AB78      ************************************************************
   AB79      *MODIFY SEARCH SECTION FOR SOURCE CHANNEL.
   AB80                 B      PMANYA            GO STORE BA OP           7  01718  J01897
   AB81                 DCW    @0C332@             FROM THIS LOCATION     5  01729
   AB82                 DCW    SBRERR                TO ALL THESE LOCATIONS 5  01734  00826
   AB83                 DCW    SBRERP                                       5  01739  00909
   AB84                 DCW    SARBA                                        5  01744  00761
   AB85                 DCW    SBRBC                                        5  01749  00812
   AB86                 DCW    SBRBA                                        5  01754  00833
   AB87                 DCW    SBRBE                                        5  01759  00819
   AB88                 DCW    SCCRTN&5                                     5  01764  00716
   AB89                 DCW    SDCRTN&5                                     5  01769  00735
   AB90                 DCW    SBAOPC                                       5  01774  00999
   AB91                 B      PMANYA            GO STORE CHANNEL INDICATOR 7  01775  J01897
   AB92                 DCW    @0C323@             FROM THIS LOCATION     5  01786
   AB93                 DCW    SCHNNL                TO ALL THESE LOCATIONS 5  01791  00998
   AB94                 DCW    SBRERO&1                                     5  01796  00905
   AB95                 DCW    SARWD&1                                      5  01801  00757
   AB96                 DCW    SBRRD&1                                      5  01806  00803
   AB97                 DCW    SCCRTN&1                                     5  01811  00712
   AB98                 DCW    SDCRTN&1                                     5  01816  00731
   AB99                 B      SSTART                                       7  01817  J00334
   AC        ************************************************************
   AC 1      *OVERLAY PHASES ONE AND TWO.
   AC 2      PONEPH     MRCWG  CSINGL,8SETUP     MOVE MOST OF PHASE 2       12  01824  D0772700508L
                                                                                          D
   AC 3                 MRCWG                                               1  01836  D
   AC 4      ************************************************************
   AC 5      *MODIFY COMBINED PHASES FOR SINGLE PHASE OPERATION.
   AC 6      PONECC     CW     CCHWTM&1                                     6  01837  @00724
   AC 7                 SAR    BBEFDF&5          PHASE 1 TAPE READ BEF OP   7  01843  G00506A
   AC 8                 SAR    8PHASE&6          MOD DONE SWITCH BRANCH     7  01850  G00482A
   AC 9                 B      PWTLOD            GO RWD-WT LOAD PROG ALL OUTPUTS 7  01857  J08361
   AC10                 B      8PHASE                                       7  01864  J00476
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```
   PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
   AC12     ************************************************************
   AC13     *CLOSED SUBROUTINE TO STORE ONE CHARACTER MANY PLACES
   AC14     PMLCWS    SBR    INDEXB                                     7  01871  G000448
   AC15               MLNS   PMANYA,PMANYB&11   ENSURE MLCWS IS PRESENT 12  01878  D01897019401
   AC16               B      PMANYC                                     7  01890  J01916
   AC17     PMANYA    SBR    INDEXB             SET EXIT                7  01897  G000448
   AC18               MLNS   PTFREE,PMANYB&11   ENSURE MLCS IS PRESENT  12  01904  D02450019401
   AC19     PMANYC    MLCA   9&INDEXB,PMANYB&10  SET MLCS ADDRESSES      12  01916  D00+09019391
   AC20               .MLCA                                             1  01928  D
   AC21     PMANYB    MLCS   00000,00000        STORE CHARACTER         12  01929  D00000000003
   AC22               A      PMANYD,INDEXB      INCREASE BY 5           11  01941  A0195200044
   AC23     PMANYD    BZN    PMANYC,5&INDEXB,                           12  01952  V0191600+052
   AC24               B      5&INDEXB           EXIT WHEN DONE          7  01964  J00+05
   AC25               NCP                       TERMINATE               1  01971  N
   AC26     ************************************************************
   AC27     *SEARCH SECTION ENTRY.
   AC28               ORG    1972               SET SEARCH ENTRY ADDRESS      01972
   AC29               B      SRELSH             GO START SEARCH SECTION 7  01972  J01680
   AC30     ************************************************************
   AC31     *SET ENTRY TO CLOSED SUBROUTINE IN PRE-PHASE TO MANIPULATE CONTROL
   AC32     *CARDS WHEN UPDATING A TAPE.
   AC33     PENTRY    SBR    *&13               SET FOR RETURN          7  01979  G019988
   AC34               B      PCARDS             GO MANIPULATE           7  01986  J06420
   AC35     PEXITC    B      0                  RETURN TO MASTER TAPE CONTROL 7  01993  J00000
   AC36     ************************************************************
   AC37     *TYPE IDENTITY.
   AC38     PSTART    WCP    IDENT                                      10  02000  M&T001250W
   AC39               BAI    *-16                                       7  02010  R02000M
                                                                                    G
   AC40     ************************************************************
   AC41     *RELOCATE FIRST BLOCK INCLUDING PHASE ONE.
   AC42               MRCWG  ONELOC,ONEGO                               12  02017  D0669600001L
                                                                                              D
   AC43               MRCWG                                             1  02029  D
   AC44               MRCWG                                             1  02030  D
   AC45               SW     FIELD-1             TO STOP MOVE UP OF DIAG IN PH2 6  02031  ,00999
   AC46               S      IDENT-3             SET SEQUENCE NUMBER TO 000 6  02037  S01247
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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
AC48      **********************************************************************
AC49      * THE OPERATOR WILL NOW INSERT THE NECESSARY INFORMATION
AC50      * CONCERNING MEMORY SIZE,CONTROL CARDS,SOURCE OF INPUTS
AC51      * AND OUTPUTS
AC52      PTYAZ    B  B       TYP1                                              7  02043  J06087
AC53                  CCW     @CORE SIZE@ C-10K,1-20K,3-40K,ETC@,G             32  02081
AC54                  RCP     PSZ                 ONE GIGIT                    10  02083  M&I006633R
AC55                  BEX1    *-16,,              GO ANY BUT WLR & DATA CHK      7  02093  R02083,
AC56                B BAI     PTYAZ               GO ANY                         7  02100  R02043M
AC57                  B       PMANYA              GO STORE CORE SIZE DIGIT       7  02107  J01897
AC58                  CCW     PSZ                                                5  02118  06633
AC59                  CCW     PCRSIZ                                             5  02123  06635
AC60                  CCW     PRELPC&6                                           5  02128  04277
AC61                  CCW     PWTPHC&4                                           5  02133  04294
AC62                  CCW     PCRSZ                                              5  02138  06628
AC63                  A       PCRSIZ&1,PCREL&1    SET MEMORY SIZE IN INSTRUCTNS 11  02139  AC663608164
AC64                  A       PORSIZ&1,ECREL&1                                  11  02150  A0663609828
AC65                B MLCA    @BB@,BCRCLR&1       SET PH1 FOR 10K               12  02161  D0667600775I
AC66                B BCE     PNCP&12,PSZ,0       BRANCH IF 1CK SYSTEM          12  02173  B02233066330
AC67                B MLCA    @,B@,BCRCLR&1       SET PH1 FOR  OK               12  02185  D0667800775I
AC68                B BCE     PNCP&12,PSZ,1       BRANCH IF 2CK SYSTEM          12  02197  B02233066331
AC69                B MLCA    @NN@,BCRCLR&1       SET PH1 FOR 4CK & UP          12  02209  D0668000775I
AC70      PNCP    C MLCS      @NN@,BSUBON-7       NOP PH1 BL CP FOR 4CK & UP    12  02221  D0668000B303
AC71                B CCW     @N                  @ UNNECESSARY-REMOVE LATER    15  02247
AC72      *         B
AC73                  MLCA    @  @,PCCS&1         BLANK CONTROL CARD SOURCE     12  02248  D0668206639I
AC74      PTYA        B       TYP1                                               7  02260  J06087
AC75                  CCW     @CONTROL CARD SOURCE M@,G                         21  02287
AC76                  RCP     PCCS-1              READ CONTROL CARD SOURCE      10  02289  M&I006637R
AC77                  BEX1    *-16,M                                             7  02299  R02289M
AC78                  BAI     *&1                 ANY ERRORS                     7  02306  R02313M
AC79                  BCE     PMCTS,PCCS,         BRANCH IF NO SOURCE           12  02313  B0294906638
AC80                  BCE     PSYS,PCCS,T         TYPEWRITER SOURCE             12  02325  B0235706638T
AC81                  NOPWM                                                      1  02337  N
AC82                  BCE     1CCCC,PCCS-1,M      FOR MANUFACTURINGS USE        12  02338  B10CCCC6637M
AC83                  B       PCARD               CARD OR TAPE SOURCE            7  02350  J04343
```

TC5C UPDATE SECTION PRE-PHASE

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AC85	PSYS	B	TYP1	TYPEWRITER SOURCE	7	02357	J06C87
AC86		DCW	@ENTER SYSTEM CARD@,G		17	02380	
AC87		B	PMLCWS	GO STORE GM/WMS	7	02382	J01871
AC88		DCW	WMGM		5	02393	00998
AC89		DCW	LOSYS1&32		5	02398	00077
AC90		DCW	LOCHN1&56		5	02403	00134
AC91		DCW	LOCHN2&56		5	02408	00191
AC92		DCW	LOCHN3&56		5	02413	00248
AC93		DCW	LOCHN4&56		5	02418	00305
AC94	**********						
AC95	* ENTER SYSTEM CARD FROM TYPEWRITER						
AC96	PSYR	RCP	LOSYS1	READ SYSTEM CARD	1C	02419	M&T000045R
AC97		SER	PSY	STORE BAR	7	02429	G066448
AC98		BEX1	PSYR,M,S	BRANCH ON ANY BUT WLR	7	02436	R02419M,S
AC99		BA1	*&1	TURN OFF I/C INTERLOCK	7	02443	R02450M,G
AD	PTHREE	C	PSY,PSYSYS	ANY ENTRY	11	02450	C0664406572
AD 1		C BE	*&12	BRANCH IF NC ENTRY	7	02461	J02479S
AD 2		CW	LOSYS1,LNO	CLEAR %M IF ANY ENTRY	11	02468	¤0004503496
AD 3		B	TYP1		7	02479	JC6087
AD 4		DCW	@ENTER CHAN 1 CARD@,G		17	02502	

```
   PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
   AD 6      ********************************************************************
   AD 7      * ENTER CHAN 1 CONTRCL CARD FROM TYPEWRITER
   AD 8      PCHA      RCP    LOCHN1                 READ CHAN 1 CARD  10  02504  M&T000078R
   AD 9                SBR    PSY                    STORE BAR          7  02514  G066448
   AD10                BEXI   PCHA,M                 BRANCH ON ANY BUT WLR 7 02521 R02504MSG
   AD11                BAI    *C1                    TURN OFF I/O INTERLOCK 7 02528 R02535M
   AD12                C      PSY,PSYONE             ANY ENTRY          11  02535  C0664406577
   AD13                BE     *C12                   BRANCH IF NO ENTRY  7  02546  J025645
   AD14                CW     LOCHN1,LNO             CLEAR WM IF ANY ENTRY 11 02553 @0007803496
   AD15                BW     PCHBK,LOSYS1           BRANCH IF NO SYSTEM CARD ENTRY 12 02564 V02595000451
   AD16                BCE    PCHBK,LOSYS1C13,1      BRANCH IF CHAN 2 AVAILABLE 12 02576 B02595000581
   AD17                B      PMCTA                  BRANCH TO MASTER DUMP SOURCE 7 02588 J02912
   AD18      PCHBK     B      TYP1                                        7  02595  J06087
   AD19                CCW    @ENTER CHAN 2 CARD@,C                      17  02618
   AD20      ********************************************************************
   AD21      * ENTER CHAN 2 CONTRCL CARD FROM TYPEWRITER
   AD22      PCHB      RCP    LOCHN2                 READ CHAN 2 CARD  10  02620  M&T000135R
   AD23                SBR    PSY                    STORE BAR          7  02630  G066448
   AD24                BEXI   PCHB,M                 BRANCH ON ANY BUT WLR 7 02637 R02620MSG
   AD25                BAI    *C1                    TURN OFF I/O INTERLOCK 7 02644 R02651M
   AD26                C      PSY,PSYTWO             ANY ENTRY          11  02651  C0664406582
   AD27                BE     *C12                   GO IF NO ENTRY      7  02662  J026805
   AD28                CW     LOCHN2,LNO             CLEAR WM IF ANY ENTRY 11 02669 @0013503496
   AD29                BW     PCHCK,LOSYS1           BRANCH IF NO SYSTEM CARD ENTRY 12 02680 V02711000451
   AD30                BCE    PCHCK,LOSYS1C14,1      BRANCH IF CHAN 3 AVAILABLE 12 02692 B02711000591
   AD31                B      PMCTA                  BRANCH TO MASTER DUMP SOURCE 7 02704 J02912
   AD32      PCHCK     B      TYP1                   TYPE                7  02711  J06087
   AD33                CCW    @ENTER CHAN 3 CARD@,G                      17  02734
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   PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
   AC35     ********************************************************************
   AC36     * ENTER CHAN 3 CONTROL CARD FROM TYPEWRITER
   AC37     PCHC      RCP    LOCHN3                 READ CHAN 3 CARD          10  02736  M%T000192R
   AC38               SBR    PSY                    STORE BAR                  7  02746  G06644B
   AC39               BEX1   PCHC,M                 BRANCH ON ANY BUT WLR      7  02753  R02736MS
   AC40               BA1    *&1                    TURN OFF I/O INTERLOCK     7  02760  R02767MG
   AC41               C      PSY,PSYTHR             ANY ENTRY                 11  02767  C0664406587
   AC42               BE     *&12                   GO IF NO ENTRY             7  02778  J02796S
   AC43               CW     LOCHN3,LNO             CLEAR WM IF ANY ENTRY     11  02785  ¤0019203496
   AC44               BW     PCHDW,LOSYS1           BRANCH IF NO SYSTEM CARD ENTRY 12  02796  V02827000451
   AC45               BCE    PCHDW,LOSYS1&15,1      BRANCH IF CHAN 4 AVAILABLE 12  02808  B02827000601
   AC46               B      PMCTA                  BRANCH TO MASTER DUMP SOURCE  7  02820  J02912
   AC47     PCHDW     B      TYP1                   TYPE                       7  02827  J06087
   AC48               DCW    @ENTER CHAN 4 CARD@,G                            17  02850
   AC49     ********************************************************************
   AC50     * ENTER CHAN 4 CONTROL CARD FROM TYPEWRITER
   AC51     PCHD      RCP    LOCHN4                 READ CHAN 4 CARD          10  02852  M%T000249R
   AC52               SBR    PSY                    STORE BAR                  7  02862  G06644B
   AC53               BEX1   PCHD,M                 BRANCH ON ANY BUT WLR      7  02869  R02852MS
   AC54               BA1    *&1                    TURN OFF I/O INTERLOCK     7  02876  R02883MG
   AC55               C      PSY,PSYFOR             ANY ENTRY                 11  02883  C0664406592
   AC56               BE     *&12                   GO IF NO ENTRY             7  02894  J02912S
   AC57               CW     LOCHN4,LNO             CLEAR WM IF ANY ENTRY     11  02901  ¤0024903496
   AC58     PMDTA     B      PMLCWS                 GO RESTORE RECORD MARKS    7  02912  J01871
   AC59               DCW    PWMGMR&1                                          5  02923  07694
   AC60               DCW    LOSYS1&32                                         5  02928  00077
   AC61               DCW    LOCHN1&56                                         5  02933  00134
   AC62               DCW    LOCHN2&56                                         5  02938  00191
   AC63               DCW    LOCHN3&56                                         5  02943  00248
   AC64               DCW    LOCHN4&56                                         5  02948  00305
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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AD66      ********************************************************************
   AD67      *ENSURE UNAVAILABLE CHANNELS HAVE BLANK DATA IN CONTROL CARDS.
   AD68      PMCTS      BW     PDIAGS,LOSYS1          GO IF NO SYSTEM CARD ENTERED      12  02949  V03015000451
   AD69                 BCE    *&7,LOSYS1&13,1        GO IF CHN2 PRESENT                12  02961  B02979000581
   AD70                 CW     LOCHN2                 FORCE BLANK CHN2 IF CHN2 ABSENT    6  02973  ¤00135
   AD71                 BCE    *&7,LOSYS1&14,1        GO IF CHN3 PRESENT                12  02979  B02997000591
   AD72                 CW     LOCHN3                 FORCE BLANK CHN3 IF CHN3 ABSENT    6  02991  ¤00192
   AD73                 BCE    *&7,LOSYS1&15,1        GO IF CHN4 PRESENT                12  02997  B03015000601
   AD74                 CW     LOCHN4                 FORCE BLANK CHN4 IF CHN4 ABSENT    6  03009  ¤00249
   AD75      PDIAGS     B      TYP1                                                      7  03015  J06087
   AD76                 DCW    @DIAGNOSTIC TAPE SOURCE Q@,G                             24  03045
   AD77      ********************************************************************
   AD78      * MODIFY PROGRAM FOR DIAGNOSTIC TAPE SOURCE
   AD79      PMDTR      RCP    PDTS                   READ DUMP TAPE SOURCE             10  03047  M%T006645R
   AD80                 SBR    PSY                    STORE BAR                          7  03057  G06644B
   AD81                 BCB1   *-23                   BRANCH IF BUSY                     7  03064  R030472
   AD82                 BEX1   PMDTR,M S                                                7  03071  R03047M S
   AD83                 BA1    *&1                    ANY ERRORS                         7  03078  R03085M G
   AD84                 S      a1@,PSY                                                  11  03085  S0668306644
   AD85                 C      PSY,&PDTS              COMPARE ADDRESSES                 11  03096  C0664406688
   AD86                 BU     PMDXXT                 GO IF ANY ENTRY                    7  03107  J03152/
   AD87                 SW     BPHASE&1               SET WM IF NO ENTRY                 6  03114  ,00477
   AD88                 CW     BENDPH&1,BEQUAL&1                                        11  03120  ¤0096300565
   AD89                 SAR    BMODON&6                                                  7  03131  G00525A
   AD90                 SBR    BCMLOW&5                                                  7  03138  G005558
   AD91                 B      PENT-1                                                    7  03145  J03405
   AD92      PMDXXT     CW     ERWAND                                                    6  03152  ¤08248
   AD93                 MLNS   PDTS&1,BRTBGW&3        MOVE DRIVE NUMBER                12  03158  D06646004871
   AD94                 MLCS   PDTS,PLE               MOVE CHAR TO LOCKUP              12  03170  D06645066743
   AD95                 LE     PLE,PCHTBL             FIND CHANNEL LETTER              12  03182  T06674066222
   AD96                 SBR    *&6                    STORE ADDRESS OF CHANNEL CHAR     7  03194  G032068
   AD97                 MLCS   00C00,BBKSPM&1         STORE 1ST CHANNEL INDICATOR      12  03201  D00000006963
   AD98                 SAR    PMDTRX                 STORE ADDRESS OF BA OP            7  03213  G03278A
   AD99                 B      PMANYA                 GO STORE CHANNEL INDICATORS       7  03220  J01897
   AE                   DCW    BBKSPM&1                                                 5  03231  00696
   AE 1                 DCW    PREWND&1                                                 5  03236  07975
   AE 2                 DCW    ERWDSO&1                                                 5  03241  08256
```

TCSC UPDATE SECTION PRE-PHASE

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AE 4		CCW	ESPASO&1	CHANNEL CHARACTER	5	03246	08854
AE 5		CCW	EINCCO		5	03251	09049
AE 6		CCW	BRTBGW&1		5	03256	00485
AE 7		CCW	PMCRE&1		5	03261	03372
AE 8		CCW	PMCSP&1		5	03266	03389
AE 9		B	PMANYA	STORE BA OP	7	03267	J01897
AE10	PMCTRX	CCW	@ @		5	03278	
AE11		CCW	BRTBGW&1C		5	03283	00494
AE12		CCW	BBKSPM&5		5	03288	00700
AE13		CCW	PREWND&5		5	03293	07979
AE14		CCW	ERWCSO&5		5	03298	08260
AE15		CCW	ESPASO&1C	8A OP	5	03303	08863
AE16		CCW	EINCCO&1		5	03308	09050
AE17		CCW	BBEFOF		5	03313	00501
AE18		CCW	PMCRE&10		5	03318	03381
AE19		CCW	PMCSP&10		5	03323	03398
AE20		B	PMANYA	STORE DRIVE NUMBER	7	03324	J01897
AE21		CCW	BRTBGW&3		5	03335	00487
AE22		CCW	PREWND&3		5	03340	07977
AE23		CCW	ERWCSO&3		5	03345	08258
AE24		CCW	ESPASO&3	DRIVE NUMBER	5	03350	08856
AE25		CCW	EINCCO&2		5	03355	09051
AE26		CCW	BBKSPM&3		5	03360	00698
AE27		CCW	PMCRE&3		5	03365	03374
AE28		CCW	PMCSP&3		5	03370	03391
AE29	PMCRE	RWD	10	REWIND DUMP TAPE	5	03371	U%UOR
AE30		CCW	@N @	SPACER LOCATION	5	03380	
AE31		BAL	BERROR		7	03381	ROC306M G
AE32	PMCSP	CCW	@U%U1A@	SPACE 1 RECORD	5	03388	
AE33		CCW	@N @	SPACER LOCATION	5	03397	
AE34		BAL	BERROR	ANY ERROR	7	03398	ROC306M G
AE35		NOPWM			1	03405	N
AE36	PENT	B	LYES	SWITCH	7	03406	J03606
AE37	PECIS	B	TYP1		7	03413	J06087
AE38		CCW	@CARD IMAGE SOURCE M@,G	Q	19	03438	

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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

AE40      ************************************************************
AE41      * MODIFY FOR CARD IMAGE SOURCE AND READ THE FIRST ONE INTO
AE42      * THE CARD IMAGE AREA
AE43      PECIR      RCP    PCCS-1            READ CARD IMAGE SOURCE   10  03440  M&T006637R
AE44                 SBR    PSY               STORE BAR                 7  03450  G06644B
AE45                 BEX1   PECIR,S                                     7  03457  R03440MS
AE46                 BA1    *&1               ANY ERRORS                7  03464  R03471MG
AE47                 C      PSY,PEPCIS        ANY ENTRY                11  03471  C0664406604
AE48                 BL     PYES              BRANCH IF ANY ENTRY       7  03482  J03510/
AE49                 SW     BMCCCN&1          SET MOD CONE SWITCH       6  03489  ,00520
AE50                 NOP                                              1  03495  N
AE51      LNC        B      PECENA            GO IF NC CONTROL CARD CHANGES  7  03496  J04825
AE52                 B      LYES                                       7  03503  J03606
AE53      PYES       B      PCRDIM            BRANCH TO READ CARD IMAGE  7  03510  J06132
AE54           B     B      PCKECF            GO-INVALID IO UNIT OR ECF  7  03517  J03560
AE55           B     BCE    PYES,CIMAGE,      BRANCH TO IGNORE BLANK CARD  12  03524  B0351000601
AE56           B     BCE    PLEVEL,CIMAGE,L   BRANCH IF TAPE LEVEL CHANGE CARD  12  03536  B0983900601L
AE57           B     BCE    LYES,CIMAGE,X     AH HA-FOUND CHANGE CARD-GO PROCES  12  03548  B0360600601X
AE58      PCKECF B     BE     PYES              TRY AGAIN IF EOF ON READER  7  03560  J03510S
AE59           B     B      TYP1              GO TYPE ERROR MESSAGE      7  03567  J06087
AE60           B     CCW    @CARD IMAGE ERROR-FIXIT@,G                  22  03595
AE61           B     B      PECIS                                      7  03597  J03413
AE62           B     CCW    @N @  UNNECESSARY-REMOVE LATER IF SPACE IS NEEDED.  2  03605
AE63      LYES       MLCA   PCRDAA&3,BREADC&3  MODIFY CARD IMAGE       12  03606  D0633800711T
AE64                 B      PMANYA              READ                   7  03618  J01897
AE65                 CCW    PCRDAA&1C            INSTRUCTION           5  03629  06345
AE66                 CCW    BREADC&1C                                  5  03634  00718
AE67                 CCW    BREADC&17                                  5  03639  00725
AE68                 CCW    CPHDCO&5                                   5  03644  08321
AE69                 MLCS   PCRDAA&3,CPHDCO&3                         12  03645  D06338083193
AE70                 MLCS                                             1  03657  D
AE71                 MLCS                                             1  03658  D
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   PGLIN    LABEL     OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION

   AE73     ************************************************************
   AE74     * MODIFY PROGRAM FOR THE LOCATION OF THE BUFFER TAPE
   AE75              B      PECEN8              GO CHECK ON AUTO EDIT     7  03659  J04838
   AE76     PBUFER   B      TYP1                                          7  03666  J06087
   AE77              DCW    @BUFFER TAPE DRIVE Ma,G                      19  03691
   AE78     LYER     RCP    PDTS                READ                     10  03693  M%T006645R
   AE79              SBR    PSY                 STORE BAR                 7  03703  G066448
   AE80              BEX1   LYER,M                                        7  03710  R03693M
   AE81              BA1    PBUFER                                        7  03717  R03666M
   AE82              C      PSY,PBPDTS          ANY ENTRY                11  03724  C0664406609
   AE83              BE     PBUFER              NO ENTRY                  7  03735  J03666S
   AE84              MLCS   PDTS&1,LBUWT&3      MODIFY BUFFER TAPE       12  03742  D06646009033
   AE85              MLCS   PDTS,PLE            MOVE CHAR TO TABLE LOOKUP 12  03754  D06645066743
   AE86              LE     PLE,PCHTBL          FIND CHANNEL CHAR IN TABLE12  03766  T06674066222
   AE87              SBR    *&6                 STORE BAR                 7  03778  G03790B
   AE88              MLCS   0,LBUWT&1           STORE CHANNEL CHARACTER  12  03785  D00000009013
   AE89              SAR    *&6                 STORE BAR                 7  03797  G03809A
   AE90              MLCS   0,LBUWT&10          STORE BA OP              12  03804  D00000009103
   AE91              BU     PBUFER              INVALID SELECTION         7  03816  J03666/
   AE92              B      PSTRBF              GO STORE BA OP,DR NO,CHNL CHAR 7  03823  J05812
   AE93     PBCRE  *  RWD    10                  REWIND BUFFER TAPE        5  03830  U%UOR
   AE94              DCW    aN    a             SPACER LOCATION           5  03839
   AE95           *  BA1    BERROR                                        7  03840  R00306M
   AE96     ************************************************************
   AE97     *FIND ALL OUTPUT TAPE LOCATIONS-MODIFY ACCORDINGLY.
   AE98     POUTY    B      TYP1                                          7  03847  J06087
   AE99              DCW    aOUTPUT TAPE DRIVES Ma,G                     20  03873
   AF                B      *&8                 GO GET OUTPUTS            7  03875  J03889
   AF 1              B      PREOT                                         7  03882  J04197
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   PGLIN     LABEL     OPCOO  OPERANO                                          CT  ADORS  INSTRUCTION
   AF 3      **********************************************************************
   AF 4      *CLOSED SUBROUTINE TO GET OUTPUT TAPE DRIVES.
   AF 5      PECYEE    SBR    PACER-7              SET RETURN AOORESSES         7   03889  G040948
   AF 6                SBR    PACER&5                                           7   03896  G04106B
   AF 7                RCP    POUTRS               READ                         10  03903  M%T006648R
   AF 8                SBR    PSY                  STORE BAR                    7   03913  G06644B
   AF 9                BEX1   *-23,M(S)           BRANCH ANY BUT WLR           7   03920  R03903M(S)
   AF10                BA1    *&I                  TURN OFF INTERLOCK           7   03927  R03934M(G)
   AF11                SW     PRDTA8&2                                          6   03934  ,07994
   AF12                SAR    PMLN&1C              PRDTA8&1 TO PMLN&10          7   03940  G04147A
   AF13                SW                                                       1   03947  ,
   AF14                SAR    PMLC&1C              PRDTA8 TO PMLC&10            7   03948  G04039A
   AF15                C      PSY,POUONE           ANY ENTRY                    11  03955  C0664406599
   AF16      PECYEJ    BE     POUTY                NO ENTRY                     7   03966  J03847S
   AF17                S      INDEX8               ZERO INDEX REG               6   03973  S00044
   AF18                MLCS   POUTY&6,POUTRS&24    INHIBIT TABLE OVERFLOW       12  03979  003853066723
   AF19                MLCS   POUTRS&INOEX8,PLE    MOVE FIRST CHAN IND          12  03991  006W48066743
   AF20      PLUE      LE     PLE,PCHTBL           FIND CHANNEL LETTER          12  04003  T06674066222
   AF21                SBR    PMLC&5                                            7   04015  G040348
   AF22      PECYEH    BU     POUTY                GO IF INVALID CHANNEL        7   04022  J03847/
   AF23      PMLC      MLCS   00C00,PRDTA8&INDEX8                               12  04029  000000007Z923
   AF24                SAR    PMLX&5                                            7   04041  G04071A
   AF25                SBR    PMLX&10                                           7   04048  G04076B
   AF26                A      PACER,PMLX&1C        ADD 2                        11  04055  A0410104076
   AF27      PMLX      MLCS   0CCC0,00C0C                                       12  04066  000000000003
   AF28      PAD       A      a1a,INDEX8           INCREASE IX REG              11  04078  A0668300044(G)
   AF29                BCE    PREOT,PROTA8&2&INOEX8,M(G)   GO IF 2ND TBL FULL  12  04089  B0419707Z94M
   AF30      PADER     BCE    PREOT,POUTRS&INOEX8,     GO IF 1ST TBL FULL      12  04101  B0419706W48(G)
   AF31      PECYEG    BCE    POUTY,POUTRS&INOEX8,M(G) GO IF TBL FULL & EDITING 12  04113  B0384706W48M
   AF32                BBE    PZON,POUTRS&INOEX8,&  GO IF ZONE PRESENT          12  04125  W0415606W48&
   AF33      PMLN      MLNS   POUTRS&INOEX8,PROTA8&1&INDEX8                     12  04137  D06W4807Z931
   AF34                B      PAD                  MOVE NEXT CHAR               7   04149  J04078
   AF35      PZON      MLCS   POUTRS&INDEX8,PLE    MOVE CHAR FOR LOOKUP         12  04156  006W48066743
   AF36                A      a1a,PMLC&1C          UPDATE ADDRESS               11  04168  A0668304039
   AF37                A      a1a,PMLN&1C          UPDATE ADDRESS               11  04179  A0668304147
   AF38                B      PLUE                                              7   04190  J04003
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DE 3-P110

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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
AF40      ********************************************************************
AF41      *CHECK FOR SINGLE PHASE OPERATION.
AF42      PREOT     BW     *&E,BMODDN&1      GO IF MOD DONE SET-NO CRD IMAGE  12  04197  V04216005201
AF43                B      *&13              MORE THAN ONE PHASE               7  04209  J04228
AF44                BW     PONEPH,LNO        GO-NO CNTRL CRD CHANGES EITHER   12  04216  V01824034961
AF45                ZS     @5@,PREWND        NOP SOURCE TAPE REWIND FOR       11  04228  -0668907974
AF46                ZS     @5@,PREWND&5        MULTIPLE PHASE OPERATION       11  04239  -0668907979
AF47      PTWOPH    B      PDMPPH            GO RELOCATE PHASES 2 & 3          7  04250  J04264
AF48      PTORTH    B      BPHASE            GO OPERATE 2 OR 3 PHASES          7  04257  J00476
AF49      ********************************************************************
AF50      *CLOSED SUBROUTINE TO RELOCATE PHASES 2 & 3 TO UPPER MEMORY
AF51      *FOR DUMPING.
AF52      PDMPPH    SUR    PDMEXI&5          SET RETURN ADDRESS                7  04264  G04341H
AF53      PRELPC  * MRCWG  PPHASE,PPHASE     8 ADDRESS MODIFIED               12  04271  D0769507695L  D
AF54                MRCWG                                                     1  04283  D
AF55                MRCWG                                                     1  04284  D
AF56                MRCWG                                                     1  04285  D
AF57                MRCWG                                                     1  04286  D
AF58                MRCWG                                                     1  04287  D
AF59                MRCWG                                                     1  04288  D
AF60                MRCWG                                                     1  04289  D
AF61      ********************************************************************
AF62      *DUMP PHASES 2 & 3.
AF63      PWTPHC  * WTBEW  11,PPHASE         8 ADDRESS MODIFIED               10  04290  L%8107695X
AF64              * BAL    BERROR                                             7  04300  R0C306M  G
AF65      PSETCR    MLOWA  PCRSZ&4,INDEXA     SET CORE SIZE FOR PH IS USE      12  04307  D0663200039X
AF66                A      *-IC,INDEXA       ADD 1                            11  04319  A0431900039
AF67                SW     CIMAGE            DEFINE BRANCH LENGTH              6  04330  ,00601
AF68      PDMEXI    B      COCCC             RETURN                            7  04336  J0C000
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PGLIN     LABEL     CPCOD  CPERANC                                                    CT  ADDRS  INSTRUCTION
AF70      ********************************************************************
AF71      *PRE-PHASE RCUTINE TC READ CCNFIGURATION CONTROL CARC IMAGES
AF72      PCARC     B      PCRCIM          GC READ CARD IMAGE                          7  04343  J06132
AF73                B      PCARDA          ERROR OR EOF RETURN                         7  04350  J04497
AF74              B MLCWS  PWMGMR&1,CIMAGE&68  SET # TO STOP MOVE IF CHNL CARD       12  04357  D07694006697
AF75                LE     CIMAGE&3,PCRCBL FIND PRCPER ADDRESS                        12  04369  T0C604044962
AF76                SBR    *&&                                                         7  04381  G043938
AF77                MLNA   CCCCC,*&&                                                  12  04388  D0C000044057
AF78                BE     CCCCC           GC FIX                                      7  04400  J0C000S
AF79                BCE    PCFCRD,CIMAGE,X GC IF READ CHANGE CARD                     12  04407  B0469600601X
AF80              B BCE    PLEVEL,CIMAGE,L BRANCH IF TAPE LEVEL CHANGE CARD           12  04419  B0983900601L
AF81                BCE    PCARD,CIMAGE,   GC IF BLANK CARC                           12  04431  B0434300601
AF82                B      PCRCRR                                                      7  04443  J04716
AF83                CCW    a1a                                                         1  04450
AF84                CCW    a1a                                                         1  04451
AF85                CCW    PCARDB                                                      5  04456  04523
AF86                CC     aSYS1a                                                      4  04460
AF87                CCW    PCARDC                                                      5  04465  04560
AF88                CC     aCHN1a                                                      4  04469
AF89                CCW    PCARCD                                                      5  04474  04585
AF90                CC     aCHN2a                                                      4  04478
AF91                CCW    PCARDE                                                      5  04483  04610
AF92                CC     aCHN3a                                                      4  04487
AF93                CCW    PCARDF                                                      5  04492  04635
AF94      PCRCBL    CC     aCHN4a                                                      4  04496
AF95      PCARCA    BU     PCRCRR          GC DUE TO ERROR                             7  04497  J04716/
AF96                Bw     PANYCD,PANYCC&1 GC IF A CARD WAS READ                      12  04504  V04702047031
AF97                B      PCARC           GC TRY AGAIN-EOF WAS ON                     7  04516  J04343
AF98      PCARCB    Cw     LOSYS1          CLEAR INDICATOR                             6  04523  ¤00045
AF99                MLCWS  PWMGMR&1,CIMAGE&44  SET # TO STOP MOVE FOR SYSTEM         12  04529  D07694006457
AG                  MRCR   CIMAGE&12,LCSYS1 MOVE NEW SYSTEM CARD                      12  04541  D0C61300045,
AG 1                B      PCCMMN                                                      7  04553  J04677
AG 2      PCARCC    Cw     LOCHN1          CLEAR INDICATOR                             6  04560  ¤00078
AG 3                MRCR   CIMAGE&12,LCCHN1 MOVE NEW CHNL 1 CARC                     12  04566  D0C61300078,
AG 4                B      PCCMMN                                                      7  04578  J04677
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AG 6	PCARDC	CW	LOCHN2	CLEAR INDICATOR	6	04585	¤00135
AG 7		MRCR	CIMAGE&12,LOCHN2	MOVE NEW CHNL 2 CARD	12	04591	D0061300135,
AG 8		B	PCCMMN		7	04603	J04677
AG 9	PCARCE	CW	LOCHN3	CLEAR INDICATOR	6	04610	¤00192
AG10		MRCR	CIMAGE&12,LOCHN3	MOVE NEW CHNL 3 CARD	12	04616	D0061300192,
AG11		B	PCCMMN		7	04628	J04677
AG12	PCARCF	CW	LOCHN4	CLEAR INDICATOR	6	04635	¤00249
AG13		B CCW	@N	@ UNNECESSARY NOP	24	04664	
AG14		MRCR	CIMAGE&12,LOCHN4	MOVE NEW CHNL 4 CARD	12	04665	D0061300249,
AG15	PCCMMN	SW	PANYCD&1	SET CNTRL CRD READ SWITCH	6	04677	,04703
AG16		CW	LNC		6	04683	¤03496
AG17		B	PCARD	GO READ ANOTHER CARD	7	04689	J04343
AG18	PCHCRD	SW	PENT	SET CHANGE CARD INDICATOR	6	04696	,03406
AG19	PANYCD	NOPWM			1	04702	N
AG20		B	PRWDD1	GO IF AT LEAST ONE CARD READ	7	04703	J04749
AG21		CW	PENT	CLEAR CHANGE CARD INDICATOR	6	04710	¤03406
AG22	PCRDRR	B	TYP1		7	04716	J06087
AG23		DCW	@INVALID CARD IMAGE@,G		18	04740	
AG24		B	PTYA	GO RE-REQUEST	7	04742	J02260
AG25	PRWDD1	BCE	PRWDC,PCRDAA&2,B	GO IF TAPE SOURCE	12	04749	B04768063378
AG26		B	PMCTS		7	04761	J02949
AG27	PRWDC	BW	PMCTS,PENT	GO IF CHANGE CARD ON SAME TAPE	12	04768	V02949034061
AG28		MLCS	PCRDAA&3,PRWDD&3	PREPARE TO RWU CNTRL CRD SOURCE	12	04780	D06338048093
AG29		MLCS			1	04792	D
AG30		MLCS			1	04793	D
AG31		MLCS	PCRDDC,PRWDD&5		12	04794	D06345048113
AG32	PRWDC	RWU	11	RWU CONTROL CARD SOURCE TAPE	5	04806	U%U1U
AG33		BA1	*-11		7	04811	R04806M G
AG34		B	PMCTS		7	04818	J02949

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   PGLIN    LABEL     OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION
   AG36     **********************************************************************
   AG37     *PREPARE FOR AUTO EDIT IF DESIRED.
   AG38     PEDENA    SW     PEDEND            ENTRY IF NO CHANGES      6  04825  ,04859
   AG39               B      PEDENC                                     7  04831  J04844
   AG40     PEDENB    CW     PEDEND            ENTRY IF CHANGES         6  04838  ¤04859
   AG41     PEDENC    B      PEDSHA            GO FIND OUT IF EDIT IS DESIRED  7  04844  J04873
   AG42               B      PEDYEA            RETURN HERE IF YES       7  04851  J04978
   AG43               NOP                      RETURN HERE IF NO        1  04858  N
   AG44     PEDEND    B      POUTY             EXIT IF NO CHANGES-NO EDIT  7  04859  J03847
   AG45     PEDENE    B      PBUFER            EXIT IF CHANGES-NO EDIT  7  04866  J03666
   AG46     **********************************************************************
   AG47     *SHOULD THIS BE AN AUTO EDIT RUN.
   AG48     PEDSHA    SBR    PEDSHB65                                   7  04873  G049748
   AG49     PEDSHC    B      TYP1                                       7  04880  J06087
   AG50               DCW    @AUTO EDIT M Y/N@,G                       15  04901
   AG51               ROP    PEDSHD                                    10  04903  M%T004976R
   AG52               BEX1   *-16,M                                     7  04913  R04903MS
   AG53     PONSTR    BA1    *&1                                        7  04920  R04927MG
   AG54               BCE    PEDSHB,PEDSHC,Y                           12  04927  B0496904976Y
   AG55               BCE    *&8,PEDSHC,N                              12  04939  B0495804976N
   AG56               B      PEDSHC                                     7  04951  J04880
   AG57               A      PEDSHA,PEDSHB65                           11  04958  A0487304974
   AG58     PEDSHB    B      COCOC                                      7  04969  J0C000
   AG59     PEDSHD    DCW    @ @,G             ANSWER                   1  04976
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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AG62      ************************************************************
   AG63      *REQUEST EDIT OUTPUT DRIVES
   AG64      PEDYEA     MLNS   *&13,PEDYE          SET TO REQUEST 1 DRIVE      12  04978  D05002050261
   AG65                 BW     *&12,PEDEND         GO IF SINGLE PHASE          12  04990  V05013048591
   AG66                 A      *-10,PEDYE          CHANGE TO REQUEST 2 DRIVES  11  05002  A0500205026
   AG67                 CW     CMASTM&1            PROVIDE FOR EDIT MASTER MESSAGE  6  05013  ¤08268
   AG68      PEDYEC     B      TYP1                                             7  05019  J06087
   AG69       PEDYE     DCW    20 OUTPUT TAPES Ma,G                            16  05026
   AG70      PEDYEB     MLCS   PLE-1,POUTRS&5      SET GM/WM & CLEAR READ AREA 12  05043  D06673066533
   AG71                 MLCS                                                    1  05055  D
   AG72                 MLCS                                                    1  05056  D
   AG73                 MLCS                                                    1  05057  D
   AG74                 MLCS                                                    1  05058  D
   AG75                 MLCS                                                    1  05059  D
   AG76                 CW     PEDYEC&1            INITIALIZE ADDRESSES        6  05060  ¤05020
   AG77                 SAR    PEDYEG&5                                        7  05066  G04118A
   AG78                 SAR    PEDYEH&5                                        7  05073  G04027A
   AG79                 SAR    PEDYEJ&5                                        7  05080  G03971A
   AG80      PEDYZX     B      PEDYEE              GO GET OUTPUTS              7  05087  J03889
   AG81                 MLCS   *-12,POUTRS&5      ELIMINATE GM/WM             12  05094  D05093066533
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   PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AG83      ********************************************************************
   AG84      *STORE SELECTION CHARACTERS FOR EDITING.
   AG85                88E    PEDYEC,PDUTRS&1,&  GO IF INVALID DRIVE            12  05106  W0501906649&
   AG86                MLCS   POUTRS&1,PMESMX&1  OUTPUT 1 CHNL & DRIVE CHARS.   12  05118  D06649090313
   AG87                MLCS                                                     1  05130  D
   AG88                MLCS   POUTRS&1,PMESMZ&1                                 12  05131  D06649083433
   AG89                MLCS                                                     1  05143  D
   AG90                8CE    PEDYEC,PDUTRS&1,   GO IF NO DRIVE NUMBER          12  05144  B0501906649
   AG91                MLC8   PRDTAB&2,EOUTPT    SET PHASE 3 OUTPUT            12  05156  D0799409029L
   AG92                MLCS   PRDTAB,L8UWT&1     MOVE OUTPUT 1 CHNL INDIC-PH1  12  05168  D07992009013
   AG93                MLCS   PRDTAB&1,L8UWT&10  MOVE OUTPUT 1 BA OP CODE-PH1  12  05180  D07993009103
   AG94                MLCS   PRDTAB&2,L8UWT&3   MOVE OUTPUT 1 DRIVE NUMBER-PH1 12  05192  D07994009033
   AG95                8      PSTR8F             GO STORE DR NO,8A OP,CHNL CHAR  7  05204  J05812
   AG96                8W     PED,PEDEND         GO IF SINGLE PHASE EDIT       12  05211  V05391048591
   AG97                MLCS   PCNSTR,CSDCOD&11   PREVENT UNLOAD END OF PHASE 2  12  05223  D04920079413
   AG98                88E    PEDOTT,PDUTRS&2,&  GO IF OUTPUT 2 IS DIFF CHNL    12  05235  W0529006650&
   AG99                8CE    PEDYEC,PDUTRS&2,   GO IF NO OUTPUT 2 DRIVE        12  05247  B0501906650
   AH                  MLNS   PRDTAB&3,PRDTAB&2  OUTPUT 2 TO OUTPUT 1 POSITION 12  05259  D07995079941
   AH 1                MLCS   PDUTRS&2,PMESMZ&1  OUTPUT 2 DRIVE NUMBER          12  05271  D06650083433
   AH 2                8      PEDOTA                                           7  05283  J05341
   AH 3      PEDOTT    88E    PEDYEC,PDUTRS&3,&  GO IF DRIVE 2 INVALID         12  05290  W05019066516
   AH 4                8CE    PEDYEC,PDUTRS&3,                                 12  05302  B0501906651
   AH 5                MLCS   PRDTAB&5,PRDTAB&2  OUTPUT 2 TO OUTPUT 1 POSITION 12  05314  D07997079943
   AH 6                MLCS                       FOR PHASE 2 OUTPUT            1  05326  D
   AH 7                MLCS                                                     1  05327  D
   AH 8                MLCS   PDUTRS&3,PMESMZ&1  OUTPUT 2 DRIVE NUMBER          12  05328  D06651083433
   AH 9                MLCS                         & OUT 2 CHANNEL CHAR        1  05340  D
   AH10      PEDOTA    MLCS   PRDTAB&2,EINCOD&2  SET PH3 INPUT-OUT 2--PH2 OUTPUT 12  05341  D07994090513
   AH11                MLCS                                                     1  05353  D
   AH12                MLCS                                                     1  05354  D
   AH13                MLCS   PRDTAB&2,ESPASD&3  DRIVE NUMBER                   12  05355  D07994088563
   AH14                MLCS   PRDTAB&1,ESPASD&10  BA OP                         12  05367  D07993088633
   AH15                MLCS   PRDTAB,ESPASD&1    CHANNEL CHARACTER              12  05379  D07992088543
   AH16      PED       MLCA   @   @,PRDTAB&5     LIMIT PHASE 2 OUTPUT TO 1 DRIVE 12  05391  D0669207997T
```

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PGLIN   LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
AH18    ********************************************************************
AH19    *MODIFY PHASE 2 FOR PHASE 3 EDIT OPERATION
AH20    PEDMCD    MRCWG  ENDCPH,CTBCUZ      REPLACE PHASE 2 END ROUTINE      12  05403  D08560D7996L
AH21              CW     ENDPHA&1                                            6  05415  ¤00778
AH22              SAR    CSDCDO&5                                            7  05421  G07935A
AH23              B      PEDRWD             REWIND OUTPUT 1                  7  05428  J05524
AH24              BW     PEDNDP,PEDEND        GO IF SINGLE PHASE EDIT        12  05435  V05461048591
AH25              B      PDMPPH               GO WRITE PHASES 2&3 ON OUTPUT 1  7  05447  J04264
AH26              B      BPHASE               GO START MULTI EDIT            7  05454  JD0476
AH27    PEDNDP    ZA     ESPASO&5,ESPASD      NOP PH3 SPACE OVER LOAD        11  05461  &0885808853
AH28              ZA     ESPASO&5,ESPASO&1D                                  11  05472  &0885D8863
AH29              B      PDMPPH               GO WRITE PHASES 2&3 ON OUTPUT 1  7  05483  J04264
AH3D              CW     PEDRDS&1                                            6  05490  ¤05518
AH31              SAR    BRTBGM&22                                           7  05496  GD003DA
AH32              B      PEDRWD             GO REWIND OUTPUT 1               7  055D3  JD5524
AH33              B      BRTBGM             GO READ PHASES 2&3 IN LOWER      7  D551D  JDODD8
AH34    PEDRDS    B      ENDPHA             GO END PHASE 2                   7  05517  JDD777
AH35    ********************************************************************
AH36    *CLOSED SUBROUTINE TO REWIND OUTPUT 1.
AH37    PEDRWD    SBR    *&18               REWIND OUTPUT 1                  7  D5524  GD5548B
AH38    PEDMCE  * RWD    11                                                  5  D5531  U%U1R
AH39            * BAI    *-11                                                7  05536  R05531M
AH40    PEDSPC    B      OOCDO                                               7  D5543  JOODDO
AH41              H                         TERMINATION                      1  D5550  .
AH42    ********************************************************************
AH43    *PERMANENT STORAGE LOCATIONS FOR CONFIGURATION CONTROL CARDS
AH44    *WITHIN TAPE CONTROL PRE PHASE.
AH45     TCSYS1   DCW    a                                  *a                33  D5551
AH46     TCCHN1   DCW    a                                        a           40  D5584
AH47              DC     a                *a                                17  0564D
AH48     TCCHN2   DCW    a                                        a           40  05641
AH49              DC     a                *a                                17  05697
AH5D     TCCHN3   DCW    a                                        a           4D  05698
AH51              DC     a                *a                                17  05754
AH52     TCCHN4   DCW    a                                        a           40  D5755
AH53              DC     a                *a                                17  05811
```

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AH55	**********						
AH56	*CLOSED SUBRCUTINE TC SET BUFFER TAPE INFORMATION.						
AH57	PSTRBF	SBR	PSTRBD&5	SET EXIT	7	05812	G06085B
AH58		B	PMANYA	GO STORE DRIVE NUMBER	7	05819	J01897
AH59		DCW	LBUWT&3	1	5	05830	00903
AH60		DCW	PPHASE&3	2	5	05835	07698
AH61		DCW	PWTPHC&3	P	5	05840	04293
AH62		DCW	BENDPH&3	1	5	05845	00965
AH63		DCW	BRWBBF&3	1	5	05850	00982
AH64		DCW	BRTBGM&3	1	5	05855	00011
AH65		DCW	CPHCDD&3	2	5	05860	08221
AH66		DCW	CPHCDD&15	2	5	05865	08233
AH67		DCW	PBDRE&3	P	5	05870	03833
AH68		DCW	EDUMP&3	3	5	05875	09446
AH69		DCW	PEDYEL&3	3	5	05880	09470
AH70		DCW	PEDYEM&3	3	5	05885	09499
AH71		DCW	ENDDPH&3	3	5	05890	08563
AH72		DCW	ENDDPI&3	3	5	05895	08575
AH73		DCW	PEDMOE&3	P	5	05900	05534
AH74		B	PMANYA	GO STORE BA OP CODE	7	05901	J01897
AH75		DCW	LBUWT&10	1	5	05912	00910
AH76		DCW	PWTPHC&1C	P	5	05917	04300
AH77		DCW	PPHASE&10	2	5	05922	07705
AH78		DCW	PPHASE&17	2	5	05927	07712
AH79		DCW	BENDPH&1C	1	5	05932	00972
AH80		DCW	BRWBBF&5	1	5	05937	00984
AH81		DCW	BRTBGM&10	1	5	05942	00018
AH82		DCW	CPHCDD&5	2	5	05947	08223
AH83		DCW	CPHCDD&22	2	5	05952	08240
AH84		DCW	PBDRE&10	P	5	05957	03840
AH85		DCW	EDUMP&10	3	5	05962	09453
AH86		DCW	PEDYEL&10	3	5	05967	09477
AH87		DCW	PEDYEM&5		5	05972	09501
AH88		DCW	ERSTRT	3	5	05977	09057
AH89		DCW	ENDDPH&5	P3	5	05982	08565
AH90		DCW	ENDDPI&10	P3	5	05987	08582

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   PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

   AH92                DCW    PECMOE&5          P                       5  05992  05536
   AH93                B      PMANYA            GO STORE CHANNEL CHARACTER 7 05993 J01897
   AH94                DCW    LBLWT&1           1                       5  06004  00901
   AH95                DCW    PWTPHC&1          P                       5  06009  04291
   AH96                DCW    PPHASE&1          2                       5  06014  07696
   AH97                DCW    BENDPH&1          1                       5  06019  00963
   AH98                DCW    BRW8BF&1          1                       5  06024  00980
   AH99                DCW    BRT8GM&1          1                       5  06029  00009
   AI                  DCW    CPHCDO&1          2                       5  06034  08219
   AI 1                DCW    CPHCDO&13         2                       5  06039  08231
   AI 2                DCW    P8CRE&1           P                       5  06044  03831
   AI 3                DCW    EDUMP&1           3                       5  06049  09444
   AI 4                DCW    PECYEL&1          3                       5  06054  09468
   AI 5                DCW    PECYEM&1          3                       5  06059  09497
   AI 6                DCW    ERSTRT&2          3                       5  06064  09059
   AI 7                DCW    ENDCPH&1          3                       5  06069  08561
   AI 8                DCW    ENDCPI&1          3                       5  06074  08573
   AI 9                DCW    PECMOE&1          P                       5  06079  05532
   AI10      PSTR8D    B      00C00             RETURN                  7  06080  J00000
   AI11      **********************************************************************
   AI12      * STANDARD TYPE ROUTINE 2.
   AI13      TYP1      SBR    TYP2&8            STORE MESSAGE ADDRESS   7  06087  G06102B
   AI14      TYP2      HCP    0                 TYPE MESSAGE           10  06094  M%T000000W
   AI15                SBR    TYP3&5            SET RETURN ADDRESS      7  06104  G06130B
   AI16                BCB1   *-23              BRANCH BUSY             7  06111  R060942
                                                                                    G
   AI17                BA1    *&1               BRANCH ANY              7  06118  R06125M
   AI18      TYP3      B      0                 RETURN TO PROGRAM       7  06125  J00000
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AI20	**********						
AI21	*PRE-PHASE CLOSED SUBROUTINE TO READ CARD IMAGES.						
AI22	PCRDIM	SBR	PCRDEX&5	SET EXITS	7	06132	G06382B
AI23		SBR	PCRERX&16		7	06139	G06400B
AI24		A	*-17,PCRDEX&5	ADD 7 TO EXIT	11	06146	A0613906382
AI25		LLE	PCCS-1,PCHTBL	FIND CHANNEL	12	06157	T06637066223
AI26		SBR	PCRDBB&5		7	06169	G061888
AI27		BU	PCRERX	ERROR-INVALID CHANNEL	7	06176	J06384/
AI28	PCRDBB	MLCS	00C00,PCRDAA&1	MOVE CHANNEL SELECT CHARACTER	12	06183	D00000063363
AI29		SAR	*&6		7	06195	G06207A
AI30		MLCS	00C00,PCRDCC	SET BA OP CODE	12	06202	D00000063453
AI31		MLCA	PCRDRD,PCRDAA&3	SET FOR CARD READER	12	06214	D0659406338T
AI32		MLCS	@1@,BERHLT&12	MOVE 1 TO ID ERROR RTN BCE	12	06226	D06683004193
AI33		BCE	PCRDAA,PCCS,C	GO IF CARD READER	12	06238	B0633506638C
AI34		MLCA	@2C@,PCRDAA&3	SET FOR 7223 CARD READER	12	06250	D0669406338T
AI35		MLCS	*&12,BERHLT&12	MOVE 2 TO ID ERROR RTN BCE	12	06262	D06285004193
AI36		BCE	PCRDAA,PCCS,2	GO IF 7223 READER	12	06274	B0633506638Z
AI37		BBE	PCRERX,PCCS,6	ERROR-INVALID TAPE SELECTION	12	06286	W0630406638&T
AI38		BBE	*&8,PCCS,M	GO-OK	12	06298	W0631706638MT
AI39		B	PCRERX	GO-INVALID TAPE SELECTION	7	06310	J06384
AI40		MLCS	PCCS,PCRDAA&3	SET DRIVE SELECTION	12	06317	D06638063383
AI41		MLCS	@B@	SET FOR TAPE	6	06329	006695
AI42	PCRDAA	LU	%11,CIMAGE,$		10	06335	L%1100601$
AI43	PCRDCC	BAI	BERROR		7	06345	R00306MG
AI44		SW	CIMAGE		6	06352	,00601
AI45		MLCS	PCRDCC,*&1		12	06358	D06345063703
AI46		BEFI	PEOFER	GO-NOTHING TO READ	7	06370	R064028
AI47	PCRDEX	B	00C00	NORMALEXIT	7	06377	J00000
AI48	PCRERX	C	PCRERX,PCRDEX	SET UNEQUAL INDICATOR FOR ERROR	11	06384	C0638406377
AI49		B	00C00	ERROR OR EOF EXIT	7	06395	J00000
AI50	PEOFER	C	PEOFER,PEOFER	SET EQUAL INDICATOR FOR EOF	11	06402	C0640206402
AI51		B	PCRERX&11		7	06413	J06395

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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
A152      ********************************************************************
A153      *CLOSED SUBRCUTINE TC MOVE CONTROL CARDS BETWEEN LOWER MEMORY AND
A154      *THE CONTRCL CARC AREA OF TAPE CONTROL.
A155      PCARDS    MLWS   LOSYS1,PCSWSY     SET SWITCHES             12  06420  D00045064814
A156                MLWS   LOCHN1,PCSWCN                              12  06432  D00078064944
A157                MLWS   LOCHN2,PCSWTC                              12  06444  D00135065074
A158                MLWS   LOCHN3,PCSWTR                              12  06456  D00192065204
A159                MLWS   LOCHN4,PCSWFR                              12  06468  D00249065334
A160                NCP                     MOVE OLC CARDS DOWN IF NOT  1  06480  N
A161      PCSWSY    MRCR   TCSYS1,LCSYS1    REPLACED BY NEW CARDS      12  06481  D0555100045.
A162                NCP                                                1  06493  N
A163      PCSWCN    MRCR   TCCHN1,LCCHN1                               12  06494  D0558400078.
A164                NCP                                                1  06506  N
A165      PCSWTC    MRCR   TCCHN2,LCCHN2                               12  06507  D0564100135.
A166                NCP                                                1  06519  N
A167      PCSWTR    MRCR   TCCHN3,LCCHN3                               12  06520  D0569800192.
A168                NCP                                                1  06532  N
A169      PCSWFR    MRCWR  TCCHN4,LCCHN4                               12  06533  D0575500249M
A170                MRCR   LOSYS1,TCSYS1    MOVE ALL 5 CARDS UP TC     12  06545  D0004505551.
A171                MRCR                    TAPE CONTROL.              1  06557  D
A172                MRCR                                               1  06558  D
A173                MRCR                                               1  06559  D
A174                MRCR                                               1  06560  D
A175              B B      PUPLEV            GO UPDATE LEVEL            7  06561  J07296
A176      ********************************************************************
A177      *TAPE CONTROL PRE-PHASE CONSTANTS AND STORAGE.
A178      PSYSYS    CCW    LOSYS1&1                                     5  06572  00046
A179      PSYONE    CCW    LOCHN1&1                                     5  06577  00079
A180      PSYTWC    CCW    LOCHN2&1                                     5  06582  00136
A181      PSYTHR    CCW    LOCHN3&1                                     5  06587  00193
A182      PSYFCR    CCW    LOCHN4&1                                     5  06592  00250
A183      PCRCRC    CCW    @12@              FCR CARD READ X CONTROL FIELD  2  06594
A184      PCUONE    CCW    PCLTRS&1                                     5  06599  06649
A185      PEPCIS    CCW    PCIS&1                                       5  06604  06638
A186      PEPCTS    CCW    PCIS&1                                       5  06609  06646
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AI88		DCW	ā.ā	TABLE OF CHANNELS	1	06610	
AI89		DCW	āR2Eā		3	06613	
AI90		DCW	āXEFā		3	06616	
AI91		DCW	ā3MGā		3	06619	
AI92	PCHTBL	DCW	ā1.Hā		3	06622	
AI93	PSTPMV	DCW	CPHBEG-1	FIRST LOCATION OF PHASE 2 -1	5	06627	07694
AI94	PCRSZ	DCW	ā0S9S9ā	CORE SIZE	5	06628	
AI95	PSZ	DC	ā0ā,G		1	06633	
AI96	PCRSIZ	DCW	09	CORE SIZE	2	06635	
AI97	PCCS	DCW	ā ā,G	CONTROL CARD SOURCE	2	06638	
AI98	PSY	DCW	COCCC		5	06644	
AI99	PCTS	DCW	ā ā,G		2	06645	
AJ	PCIS	EQU	PCCS-1				
AJ 1	PCUTRS	DCW	ā ā		1	06648	
AJ 2		DCW	ā ā		1	06649	
AJ 3		DCW	ā ā		1	06650	
AJ 4		DCW	ā ā		1	06651	
AJ 5		DCW	ā ā		1	06652	
AJ 6		DCW	ā ā		1	06653	
AJ 7		DCW	ā ā		1	06654	
AJ 8		DCW	ā ā		1	06655	
AJ 9		DCW	ā ā		1	06656	
AJ10		DCW	ā ā		1	06657	
AJ11		DCW	ā ā		1	06658	
AJ12		DCW	ā ā		1	06659	
AJ13		DCW	ā ā		1	06660	
AJ14		DCW	ā ā		1	06661	
AJ15		DCW	ā ā		1	06662	
AJ16		DCW	ā ā		1	06663	
AJ17		DCW	ā ā		1	06664	
AJ18		DCW	ā ā		1	06665	
AJ19		DCW	ā ā		1	06666	
AJ20		DCW	ā ā		1	06667	
AJ21		DCW	ā ā		1	06668	
AJ22		DCW	ā ā		1	06669	
AJ23		DCW	ā ā		1	06670	

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PGLIN     LABEL      OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION

AJ26                 DCW    @ @                                                        1  06671
AJ27                 DCW    @ @,G                                                      1  06672
AJ28      PLE        DCW    @ @                                                        1  06674
AJ29      ************************************************************************
AJ30      *TAPE CONTROL PRE-PHASE LITERAL CONSTANTS
AJ31                 LTORG  *                                                             06675
AJ31                        @8B@                                                       2  06676
AJ31                        @,B@                                                       2  06678
AJ31                        @NN@                                                       2  06680
AJ31                        @  @                                                       2  06682
AJ31                        @1@                                                        1  06683
AJ31                        PDTS                                                       5  06688  06645
AJ31                        @5@                                                        1  06689
AJ31                        @   @                                                      3  06692
AJ31                        @Z0@                                                       2  06694
AJ31                        @B@                                                        1  06695
AJ32      ************************************************************************
AJ33      *FIRST ADDRESS OF FIRST BLOCK TO BE RELOCATED INCLUDING PHASE ONE.
AJ34      CNEGC      ORG    00001                                                            00001
AJ35      CNELCC     CCORG                                                      06696       00001
AJ36                 B      20&INDEXB          GO ON RESET/START               06696  7    00001  J00*20
AJ37      PRTBGM     CCORG  *                                                   06703       00008
AJ38      BRTBGM *   RTBGW  11,CAREA           READ PHASE TWO INTO CORE        06703 10    00008  L%B1004766$
AJ39                 BA1    BERROR             GO ON ANY INDICATOR             06713  7    00018  R00306M
AJ40                 B      CPHTPI             GO START PHASE 2                06720  7    00025  J00999
AJ41      BXSECN     DCW    @   @              SEQUENCE NUMBER OF PRESENT PROGR06729  3    00034
AJ42      PECBLN     CCORG  *                                                   06730       00035
AJ43                 DCW    @     @            INDEX REG X3                    06734  5    00039
AJ44                 DCW    @     @            INDEX REG X4                    06739  5    00044
AJ45      ************************************************************************
AJ46      *TEMPORARY STORAGE AREAS FOR CONFIGURATION CONTROL CARDS.
AJ47       LCSYS1    DCW    @                                  *@              06740 33    00045
AJ48       LCCHN1    DCW    @                                        @         06773 40    00078
AJ49                 DC     @                *@                               06829 17    00134
AJ50       LCCHN2    DCW    @                                        @         06830 40    00135
AJ51                 DC     @                *@                               06886 17    00191
AJ52       LCCHN3    DCW    @                                        @         06887 40    00192
AJ53                 DC     @                *@                               06943 17    00248
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PGLIN    LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

AJ55     LCCHN4    OCW    @                                    @      06944 40  00249
AJ56               DC     @                  *@                       07000 17  00305
AJ57     ********************************************************************
AJ58     *IO OPERATION ERROR ROUTINE-THIS ROUTINE IS COMMON TO ALL IO
AJ59     *OPERATIONS IN THIS PROGRAM.
AJ60     BERROR    SBR    INDEXB             SET RETURN IN INDEX REG       07001  7  00306  G000448
AJ61               S      BWENTY&1,INDEXB      SUBTRACT 20 FROM INDEXB     07008 11  00313  S0045800044
AJ62               MLCS   13&INDEXB,BERREX     SET OP FOR BUSY/NT RDY CHK  07019 12  00324  000*13003843
AJ63               MLCS   BERREX,BERREX-7      SET OP FOR DATA CHECK CHK   07031 12  00336  D00384003773
AJ64               CW                                                     07043  1  00348  ¤
AJ65               CW                                                     07044  1  00349  ¤
AJ66               CW                                                     07045  1  00350  ¤
AJ67               CW                                                     07046  1  00351  ¤
AJ68               CW                                                     07047  1  00352  ¤
AJ69               CW                                                     07048  1  00353  ¤
AJ70               MLCS                       SET OP FOR EOF CHK          07049  1  00354  0
AJ71     BERBSK    MLCS   BBEFER,BERBAO       SET BA OP FOR BKSP-SKIP     07050 12  00355  D00370004393
AJ72               MLCS                       SET BKSP D MOD              07062  1  00367  D
AJ73     BDMODU    DCW    @N8@                 D MOD FOR BKSP-SKIP BA OP  07064  2  00369
AJ74     BBEFER    BEF1   20&INDEXB           CONTINUE PROGRAM IF EOF     07065  7  00370  R00*208
AJ75               BER1   BERHLT              GO ERROR HALT IF DATA CHK   07072  7  00377  R004074
AJ76     BERREX    BEX1   3&INDEXB,3          REDO IO OP IF BUSY OR NOT RDY 07079 7  00384  R00*033
AJ77               B      20&INDEXB           CONTINUE PROGRAM IF WLR     07086  7  00391  J00*20
AJ78               H                          TERMINATE HALT              07093  1  00398  .
AJ79               ORG    DNEGO&399                                                  00400
AJ80               CDORG  ONELOC&399                                      07095       00400
AJ81               B      BREADC              EXIT FOR EXECUTE CARDS      07095  7  00400  J00708
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   PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AJ83      BERHLT    H                          ERROR HALT                    07102  1  00407  .
   AJ84      ************************************************************
   AJ85      *THIS HALT HAS OCCURRED DUE TO A DATA CHECK ON THE LAST IO
   AJ86      *OPERATION.THE IO UNIT IS STILL SELECTED.
   AJ87      *1.IF A TAPE DRIVE IS SELECTED-
   AJ88      *      -TO ATTEMPT TO CORRECT ERROR BY REPEATING THE READ OR
   AJ89      *       WRITE OPERATION,DEPRESS START.
   AJ90      *      -A RESET-START ACTION WILL CAUSE THE PROGRAM TO ATTEMPT
   AJ91      *       TO CONTINUE WITHOUT CORRECTING THE BAD DATA.-CAUTION-
   AJ92      *2.IF CARD READER IS SELECTED-
   AJ93      *      -IF BAD CARD-CORRECT,MAKE READER READY,START.
   AJ94      *      -IF CARD READER ERROR-REPLACE CARD IN READER,MAKE READER
   AJ95      *       READY,START-TO TRY TO READ CARD AGAIN
   AJ96      *      -TO ATTEMPT TO USE BAD DATA-RESET,START.-CAUTION-
   AJ97      ************************************************************
   AJ98                BCE    3&INDEXB,5&INDEXB,1  GO REREAD IF CARD READER    07103 12  00408  B00+0300+051
   AJ99      BRPBKS    MLCS   6&INDEXB,BERBSP&3    SET DRIVE FOR BKSP-SKIP OP  07115 12  00420  D00+06004373
   AK                  MLCS                  SET TAPE CHAR FOR BKSP-SKIP     07127  1  00432  D
   AK 1                MLCS                  SET CHNL CHAR FOR BKSP-SKIP     07128  1  00433  D
   AK 2      BERBSP    BSP    11             BACKSPACE SKIP                  07129  5  00434  U%U18
   AK 3      BERBAD    BAI    BERBSP         RESET INTERLOCK                 07134  7  00439  R00434M
                                                                                                 G
   AK 4                S      BRTBGM,BERBSP&4  SUB -3 FROM D MOD             07141 11  00446  S0000800438
   AK 5      BWENTY    BCE    BRPBKS,BERBSP&4,E                              07152 12  00457  B0042000438E
   AK 6      BERBXT    B      3&INDEXB          GO REREAD/REWRITE RECORD     07164  7  00469  J00+03
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PGLIN     LABEL     OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION
AK 8      ********************************************************************
AK 9      *PHASE ONE STARTS HERE.PHASE ONE IS RESPONSIBLE FOR 1.READING DUMP
AK10      *RECCRDS FROM A PREVIOUSLY RECORDED DIAGNOSTIC SYSTEM TAPE. 2.READ-
AK11      *ING DELETE , PATCH , AND NEW CHANGE CARD IMAGES FROM A CARD READER
AK12      *OR TAPE CRIVE. 3.DELETING PROGRAMS , READING PATCH CARD IMAGES ,
AK13      *AND REACING NEW PROGRAM CARC IMAGES. 4.UPDATING CONFIGURATION
AK14      *CONTROL CARDS IN THE TAPE CONTROL PROGRAM. 5.COMBINING ALL INPUTS
AK15      *AND PLACING THEM ON THE BUFFER TAPE IN LONG MEMORY DUMP FORM OR
AK16      *ON THE OUTPUT TAPES IN SHORT MEMORY DUMP FROM IF THERE ARE NO CARD
AK17      *IMAGE INPUTS.
AK18      ********************************************************************
AK19      *REAC SHORT DUMP FROM DIAGNOSTIC SYSTEM TAPE IF AVAILABLE.
AK20      BPHASE    NOPWM                      SWITCH-BRANCH IF NO MORE INPUT  07171   1  00476  N
AK21                8       BSTMON           DUMP RECORDS AVAILABLE.         07172   7  00477  J00924
AK22      PRTBGW    CDORG   *                                                  07179      00484
AK23      BRTBGW *  RTBGW   10,FIELD         READ SHORT DUMP FROM MASTER     07179  10  00484  L%B0010000$
                                                                                                  G
AK24      BBADMP *  BA1     BERROR           GO ON ANY INDICATOR             07189   7  00494  R00306M
AK25      BBEFCF *  BEF1    BSTMDN           GO SET MASRER DONE IF EOF       07196   7  00501  R009248
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
AK26	**********						
AK27	*SET UP FOR MANIPULATION OF CARD IMAGE INPUTS IF AVAILABLE.						
AK28	BSETUP	CW	BBKSPS&1,BCMPSW&1	CLEAR FOR BACKSPACE & DUMPING	07203 11	00508	B0068800881
AK29	BMCCCN	NCPWM		SWITCH-BRANCH IF NO MORE CARD	07214 1	00519	N
AK30		B	BCFKTC	IMAGE INPUTS.	07215 7	00520	J0C888
AK31		MLNB	PROGSQ,BXSEQN	STORE PROGRAM SEQUENCE NUMBER	07222 12	00527	001247000034J
AK32		C	CIMAGE&4,BXSEQN	COMP CHANGE SEQ TO PROG. SEQ.	07234 11	00539	C0C60500034
AK33	BCMLCW	BL	BCFKTC	GO IF SUBJ.PROG NOT REACHED	07245 7	00550	J00888T
AK34		BF	BCKCRD	GO IF PAST SUBJ. PROGRAM	07252 7	00557	J00582U
AK35	BEQUAL	SW	BBKSPS&1	SET FOR NO BACKSPACE	07259 6	00564	,0C688
AK36		BCE	BBKSPS,CIMAGE&1,P	EQUAL SO GO IF PATCH CARD	07265 12	00570	B0068700602P
AK37	BCKCRD	BCE	BBKSPS,CIMAGE&1,N	GO IF NEW TYPE CHANGE CARD	07277 12	00582	B0068700602N
AK38		B	BSKPCI		07289 7	00594	J0C681
AK39		ORG	ONEGC&60C			00601	
AK40	*	B	PRE-PHASE SUBROUTINE TO UPDATE LEVEL OF NEW TAPE				
AK41	PUPLEV	B	CCORG ONELCC&6CC		07296	00601	
AK42	CIMAGE	B	MLCB PWMGMR-27,PUPOLC&3	OLD LEVEL TO TYPEOUT	07296 12	00601	00766607346L
AK43		B	MLCA BENCPH&9,PWMGMR-27	NEW LEVEL OLD TC50 TO NEW TC50	07308 12	00613	D0097107666T
AK44		B	MLCB PWMGMR-27,PUPNEW&3	NEW LEVEL TO TYPEOU	07320 12	00625	00766607362L
AK45		B	B TYP1		07332 7	00637	J06087
AK46		B	CCW @OLC-@		07342 4	00647	
AK47	PUPOLC	B	CCORG *		07343	00648	
AK48		B	CCW @ @,G		07346 4	00651	
AK49		B	B TYP1		07348 7	00653	J06087
AK50		B	CCW @NEW-@		07358 4	00663	
AK51	PUPNEW	B	CCORG *		07359	00664	
AK52		B	CCW @ @,G		07362 4	00667	
AK53		B	B PEXITC		07364 7	00669	J01993
AK54		B	CCW @ @	FILL OUT 80 CHAR. READ IN AREA	07375 5	00680	
AK55	BSKPCI	SW	BCMPSW&1	SET TO SKIP DUMP OF RECORD	07376 6	00681	,00881
AK56	**********						
AK57	*BACKSPACE MASTER TAPE IF SWITCH IS CLEARED.						
AK58	BBKSPS	NCP		SWITCH TO BYPASS BACKSPACE OF	07382 1	00687	N
AK59		B	BREADC	MASTER TAPE	07383 7	00688	J00708
AK60	PBKSPM	CCORG	*		07390	00695	
AK61	BBKSPM *	BSP	10	BACKSPACE MASTER TAPE	07390 5	00695	U&L08
AK62	BBABKS *	BA1	BBKSPM	GO ON ANY INDICATOR	07395 7	00700	R00695M G

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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
   AK64      ********************************************************************
   AK65      *READ CARD IMAGE INTO CARD IMAGE READ AREA.
   AK66                 NOP                                                07402  1  00707  N
   AK67      BREADC     CCORG  *                                           07403     00708
   AK68      BREADC  *  LU     %11,CIMAGE,$                               07403 10  00708  L%11006015
   AK69      BBADRD  *  BAI    BERROR          GO ON ANY INDICATOR        07413  7  00718  R00306M
   AK70      BBEFCC  *  BEFI   BSTMCC          GO SET MCD DONE SWITCH     07420  7  00725  R008748
   AK71                 DC     CIMAGE          DEFINE BRANCH LENGTH       07427  6  00732  ,00601
   AK72                 BCE    BCMPSW,CIMAGE,X GO IF CHANGE CARD          07433 12  00738  B0088000601X
   AK73                 BW     BSTRCD,CIMAGE&5 GO STORE CARD IF PROGRAM CARD 07445 12  00750  V00795006061
   AK74      BCKBXC     BCE    BREADC,CIMAGE&71,*  GO IF BRANCH CONTROL    07457 12  00762  B0070800672*
   AK75      BCRCLR     SW        2CK SYS-STEP AAR/BAR-BCE IF 10K SYS,20K C.C.  07469  1  00774  *
   AK76                 BCE                          BCE IF 10K/20K SYS,40K C.C.07470  1  00775  B
   AK77                 BCE    CIMAGE&1,CIMAGE,E   GO EXECUTE EXECUTE CARD  07471 12  00776  B0060200601E
   AK78                 B      BREADC              GO READ NEXT CARD         07483  7  00788  J00708
   AK79      ********************************************************************
   AK80      *STORE CARD IMAGE IN ITS PROPER LOCATION.
   AK81      BSTRCD     MLNA   CIMAGE&4,BCRCMV&10  STORE STARTING ADDRESS     07490 12  00795  D0060500858/
   AK82                 A      CIMAGE&9,CIMAGE&4   CALCULATE HI CRD ADR &1  07502 11  00807  A0061000605
   AK83                 ZA     CIMAGE&9,INDEX8     LENGTH OF FIELD TO IX REG 07513 11  00818  &0061000044
   AK84                 C                          IS MEMORY TOO SMALL       07524  1  00829  C
   AK85                 BL     BREADC              GO IF YES                 07525  7  00830  J00708T
   AK86      BSUBCN     A      BCRDAG,INDEX8       SUBT 1 FROM INDEX         07532 11  00837  A0086700044
   AK87      BCRCMV     MLCWS  CIMAGE&1C&INDEX8,0&INDEX8  STORE CHARACTER  07543 12  00848  D00W1100*007
   AK88                 BZ     BREADC              RELOCATED-GO READ NEXT CARD 07555 7  00860  J00708V
   AK89      BCRCAG     B      BSUBCN              MOVE NEXT CHARACTER       07562  7  00867  J00837
   AK90      ********************************************************************
   AK91      *SET MCC DONE SWITCH
   AK92      BSTMCC     SW     BMCDON&1                                      07569  6  00874  ,00520
   AK93      ********************************************************************
   AK94      *DUMP THIS PROGRAM ON THE BUFFER TAPE IF PROGRAM IS NOT DELETED.
   AK95      BCMPSW     NOP                                                07575  1  00880  N
   AK96                 B      BPHASE              GO IF DUMP NOT DESIRED    07576  7  00881  J00476
   AK97      BCHKTC     BCE    PENTRY,PROGSC,V     GO STR CTL CDS IN TAPE CONTROL 07583 12  00888  B01979012479
   AK98      LBDWT      WTBEW  11,FIELD            WRITE BUFFER DUMP         07595 10  00900  L%81010DDX
   AK99                 BAI    BERROR              GO ON ANY INDICATOR       07605  7  00910  R00306M
   AL                   B      BPHASE              GO RESTART PHASE ONE      07612  7  00917  J00476
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PGLIN    LABEL     OPCOO  OPERAND                                          CT  ADDRS  INSTRUCTION

AK91     ********************************************************************
AK92     *PHASE ONE RCUTINE-SET MASTER CONE
AK93     8STMCN    Sw     8PHASE&1          SET MASTER CONE SWITCH         07619  6  00924  ,00477
AK94               CW     BENCPH&1,BEQUAL&1                                07625 11  00930  ¤0096300565
AK95               SAR    8MCCCN&6          STORE FCR WRITING TAPE MARK    07636  7  00941  G00525A
AK96               SBR    BCMLOW&5          STORE TO BRANCH ON LOW         07643  7  00948  G00555B
AK97               B      BSETUP                                           07650  7  00955  J00508
AK98     ********************************************************************
AK99     *PHASE ONE RCUTINE TC ENC PHASE ONE
AL       8ENCPH  *  WTM    11                WRITE TAPE MARK                07657  5  00962  U%U1M
AL 1               CCW    @N    @                                          07666  5  00971
AL 2          *    8A1    8ERROR            GO ON ANY INDICATOR            07667  7  00972  R00306M
                                                                                            G
AL 3     8RWB8F *  RWD    11                REWIND BUFFER TAPE             07674  5  00979  U%U1R
AL 4     88A8FR *  8A1    8RWB8F            GO ON ANY INDICATOR            07679  7  00984  R00979M
                                                                                            G
AL 5               8      8RT8GM            GO READ PHASE 2 INTO CORE      07686  7  00991  J00008
AL 6               CCW    @M@               TERMINATE BRANCH               07693  1  00998
                          G
AL 7               ORG    CNEG0&997         ENSURE WM IN 00998                    00998
AL 8     PWMGMR    CCORG  ONELOC&997                                        07693     00998
AL 9      WMGM     CCW    @M+@              TERMINATE MCVE                 07693  2  00998
                          G
AL10     ********************************************************************
AL11     *PHASE TWO SECTICN-PHASE TWO 1.REACS LONG DUMPS FROM THE BUFFER
AL12     *TAPE. 2.ACCS APPLICABLE CONFIGURATION CONTROL CARDS TC THE
AL13     *DIAGNOSTIC PROGRAMS. 3.WRITES SHORT CUMPS ON ALL OUTPUT TAPES.
AL14     CPHASE    ORG    8PHASE                                                 00476
AL15     CPH8EG    CCORG  *                                                 07695     00476
AL16     PPHASE    CCORG  *                                                 07695     00476
AL17     ********************************************************************
AL18     *REAC 8UFFER TAPE DURING PHASE 2 - READ NEW MASTER IF PHASE 3.
AL19     CPHASD  *  RTBGW  11,FIELD          READ LONG DUMP FROM BUFFER     07695 10  00476  L%81010008
AL20               *  8A1    8ERROR            GO ON ANY                      07705  7  00486  R00306M
                                                                                            G
AL21               *  BEF1   CCHWTM            GO CHANGE WTBEW TO WTM         07712  7  00493  R007238
AL22               B      CMVACC            GO MANIPULATE CONTRCL CARDS    07719  7  00500  J00845
AL23     CASTER    CCW    @*@               CCNSTANT ASTERISK              07726  1  00507
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PGLIN    LABEL     OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION
AL25     ********************************************************************
AL26     *RELOCATE DIAGNOSTIC TO UPPER MEMORY TO MAKE A SHORT DUMP.
                   ORG    8SETUP                                                        00508
AL27                                                                          07727    00508
AL28     CSINGL    EQUATE *
AL29     CRELPR    MLN8   TOPTHO,CRELPC-3      SET TOP 1000S ADDR OF PROG     07727 12 00508  D0124900950J
AL30               MLCWA  CRELPC,INDEXA        INDEXA TO TOP 1000S OF PROG    07739 12 00520  D0095300039X
AL31               MLCWA                       INDEXX TO TOP 1000S OF MEM     07751  1 00532  D
AL32               C      INDEXA,INDEXX        IS PROGRAM LARGER THAN CORE    07752 11 00533  C0003900034
AL33               BL     CPHASE               GO SKIP THIS ONE IF YES        07763  7 00544  J00476T
AL34     CRELPA    MLCWA  0&INDEXA,0&INDEXX    MOVE PART OF PROG UP           07770 12 00551  D000&0000-0X
AL35               SAR    INDEXA               SET FOR NEXT MOVE              07782  7 00563  G00039A
AL36               SBR    INDEXX                                              07789  7 00570  G00034B
AL37               C      INDEXA,CZFLDL        IS ENTIRE PROGRAM MOVED        07796 11 00577  C0003900943
AL38               BU     CRELPA               GO IF NOT COMPLETE             07807  7 00588  J00551/
AL39     ********************************************************************
AL40     *WRITE THIS DIAGNOSTIC ON ALL OUTPUT TAPES IN SHORT DUMPS.
AL41     CSDUMP    SW     CTBDUT&1             SET INITIAL TAPE TABLE ADDRESS I07814  6 00595  ,00774
AL42               SAR    INDEXA               INDEX REGISTER                 07820  7 00601  G00039A
AL43     CSDUMA    MRC    0&INDEXA,CSDWRT&1    SET CHNL CHAR. IN WRITE OP     07827 12 00608  D000&000659#
AL44               MRC    1&INDEXA,CSDUBA      SET BA OP CODE                 07839 12 00620  D000&100668#
AL45               SAR    INDEXA               SAVE ADDRESS                   07851  7 00632  G00039A
AL46     CSDDRI    MRC    0&INDEXA,CSDWRT&3    SET DRIVE NO. IN WRITE OP      07858 12 00639  D000&000661#
AL47               SAR    INDEXA                                              07870  7 00651  G00039A
AL48     PCSDW     EQUATE *                                                    07877    00658
AL49     CSDWRT  * WTBEW  11,3&INDEXX          DUMP FROM PROGRAMS START       07877 10 00658  L%B1000-3X
                                                                                                  G
AL50     CSDUBA    BAI    BERRDR               GO ON ANY INDICATOR            07887  7 00668  R00306M
AL51               BBE    CSDUMA,0&INDEXA,&    IF ZONE-GO SET NEW CHNL IN OP  07894 12 00675  W00608000&0&
                                                                                                  T
AL52               BBE    CSDDRI,0&INDEXA,M    GO WRT NEXT DRIVE IF NUMERIC   07906 12 00687  W0063900O&0M
AL53     CSDDWN    BCE    CTYPEO,CSDWRT,L      GO TYPE TITLE                  07918 12 00699  B0095600658L
AL54     CSDCCO    EQUATE *                                                    07930    00711
AL55     CSDDCN    BCE    CREWND,CSDWRT&4,U    GO IF REWOUND                  07930 12 00711  B0075500662U
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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AL57      CCHWTM     MLCWA  CCWTMX,CSDWRT&5    CHANGE WTBEW TO WTM TO RWU    07942 12  00723  D0093800663X
   AL58                 MLCWA                                                    07954  1  00735  D
   AL59                 MLCS   CSDCON&11,CCWTMX-1  SET TO MAKE RWU NEXT TIME    07955 12  00736  D00722009373
   AL60                 B      CSDUMP             GO WRITE TAPE MARKS OUTPUT DRIVE07967  7  00748  J00595
   AL61      ************************************************************
   AL62      *REWIND SOURCE TAPE TO END DUPLICATION PASS. NOPO OTHER PASSES.
   AL63      PREWND     CCORG  *                                                 07974     00755
   AL64      CREWND   * RWD    11                 REWIND SOURCE TAPE            07974  5  00755  U%U1R
   AL65               * BAL    CREWND             GO ON ANY                     07979  7  00760  R00755M
   AL66      CREEND     H      CREEND                                           07986  6  00767  .00767
   AL67      ************************************************************
   AL68      *TABLE OF OUTPUT TAPE DRIVES AND TAPE CHANNELS.THIS TABLE IS SET UP
   AL69      *FOR UP TO 20 OUTPUT TAPES.
   AL70      PRDTAB     CCORG  *                                                 07992     00773
   AL71      CTBOUT     DCW    a a                                               07992  1  00773
   AL72                 DCW    a a                                               07993  1  00774
   AL73                 DCW    a a                                               07994  1  00775
   AL74                 DCW    a a                                               07995  1  00776
   AL75      CTBOUZ     CCORG  *                                                 07996     00777
   AL76      CTBOUX     DCW    a a                                               07996  1  00777
   AL77                 DCW    a a                                               07997  1  00778
   AL78                 DCW    a a                                               07998  1  00779
   AL79                 DCW    a a                                               07999  1  00780
   AL80                 DCW    a a                                               08000  1  00781
   AL81                 DCW    a a                                               08001  1  00782
   AL82                 DCW    a a                                               08002  1  00783
   AL83                 DCW    a a                                               08003  1  00784
   AL84                 DCW    a a                                               08004  1  00785
   AL85                 DCW    a a                                               08005  1  00786
   AL86                 DCW    a a                                               08006  1  00787
   AL87                 DCW    a a                                               08007  1  00788
   AL88                 DCW    a a                                               08008  1  00789
   AL89                 DCW    a a                                               08009  1  00790
   AL90                 DCW    a a                                               08010  1  00791
   AL91                 DCW    a a                                               08011  1  00792
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   PGLIN    LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AL93             DCW    @ @                                    08012  1  00793
   AL94             DCW    @ @                                    08013  1  00794
   AL95             DCW    @ @                                    08014  1  00795
   AL96             DCW    @ @                                    08015  1  00796
   AL97             DCW    @ @                                    08016  1  00797
   AL98             DCW    @ @                                    08017  1  00798
   AL99             DCW    @ @                                    08018  1  00799
   AM               DCW    @ @                                    08019  1  00800
   AM 1             DCW    @ @                                    08020  1  00801
   AM 2             DCW    @M@                                    08021  1  00802
   AM 3             ORG    CPHASE&369         ENSURE WM IN 00998             00845
   AM 4             CDORG  PPHASE&369                             08064       00845
   AM 5     ********************************************************************
   AM 6     *MOVE APPLICABLE CONTROL CARDS FROM LOWER MEMORY TO DIAGNOSTIC.
   AM 7     CMVACC    88E    CMFIVE,TOPTHO-1,8  GO MOVE SYS1,CHN1,CHN2,CHN3,CHN408064 12  00845  W00888012488
   AM 8             88E    CMTHRE,TOPTHO-1,-  GO MOVE SYS1,CHN1,CHN2 CNLY  08076 12  00857  W00901012488-
   AM 9             88E    CMCNNE,TOPTHO,8    GO MOVE SYS1 ONLY            08088 12  00869  W00914012498
   AM10             8      CRELPR             DONT MOVE ANY CARDS          08100  7  00881  J00508
   AM11     CMFIVE    MRCR   LOCHN3,CHN3       MOVE CHN3 CARD               08107 12  00888  00019201403,
   AM12             MRCR                      MOVE CHN4 CARD               08119  1  00900  0
   AM13     CMTHRE    MRCR   LOCHN1,CHN1       MOVE CHN1 CARD               08120 12  00901  00007801289,
   AM14             MRCR                      MOVE CHN2 CARD               08132  1  00913  0
   AM15     CMCNNE    MRCR   LOSYS1,SYS1       MOVE SYS1 CARD               08133 12  00914  00004501256,
   AM16             8      CRELPR             GO CONTINUE PHASE 2          08145  7  00926  J00508
   AM17     ********************************************************************
   AM18     *PHASE 2 CONSTANTS AND STORAGE.
   AM19             DCW    @U%U1M@                                08156  5  00937
   AM20     CCWTMX    DCW    @N@                                    08157  1  00938
   AM21     CZFLDL    DCW    FIELDS                                 08162  5  00943  00997
   AM22     PCREL     CDORG  *                                      08163       00944
   AM23              *  DCW    @00999@            TOP THOUSANDS ADDR OF MEM    08167  5  00948
   AM24     CRELPC    DCW    @0C999@            TOP THOUSANDS ADDR OF PROG   08172  5  00953
   AM25     CXBLNK    DCW    @ @                                    08174  2  00955
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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AM27      ********************************************************************
   AM28      *TYPE THIS DIAGNOSTICS SEQUENCE NUMBER AND IDENTITY.
   AM29      CTYPEO     ZA     TOPTHO-997&INDEXX  CLEAR SEQUENCE ZONES           08175  6  00956  &002N2
   AM30                 MLCA   CXBLNK,TOPTHO-997&INDEXX  CLEAR TOPTHO IN PROGRAM 08181 12  00962  D00955002N2T
   AM31      CTYPEW     WCP    PROGSQ-999&INDEXX  TYPE IT                       08193 10  00974  M%T0002M8W
   AM32                 BAL    CTYPEW                                           08203  7  00984  R00974M
                                                                                                    G
   AM33      CTYPPO     B      CPHASE             GO DUMP NEXT PROGRAM          08210  7  00991  J00476
   AM34      CPHEND     EQU    *                  LAST ENTRY IN PHASE 2         08217     00998
   AM35                 DCW    @M@       STOP OVERLAY-THIS GM/WM MUST BE IN 00998 08217  1  00998
                                  G
   AM36      ********************************************************************
   AM37      *READ PHASES 2 & 3 BACK INTO UPPER CORE.
   AM38      *REWIND & UNLOAD CARD IMAGE TAPE IF MODIFYING FROM TAPE.
   AM39      CPHEQU     EQU    *                                                08218     00999
   AM40      CPHTPI   * BSP    11                 BACKSPACE BUFFER              08218  5  00999  U%U1B
   AM41               * BAL    *-11                                             08223  7  01004  R00999M
                                                                                                    G
   AM42               * RTBGW  11,PPHASE          REREAD PHASES 2&3 INTO        08230 10  01011  L%81076955
   AM43               * BAL    BERROR               UPPER MEMORY                08240  7  01021  R00306M
                                                                                                    G
   AM44                 NOP                                                     08247  1  01028  N
   AM45      ERWAND     EQU    *                                                08248     01029
   AM46                 B      *&13               GO IF NO SOURCE TAPE          08248  7  01029  J01048
   AM47      ERWDSO     EQU    *                                                08255     01036
   AM48               * RWU    11                 REWIND/UNLOAD SOURCE TAPE     08255  5  01036  U%U1U
   AM49               * BAL    *-11                                             08260  7  01041  R01036M
                                                                                                    G
   AM50      CMASTM     EQU    *                                                08267     01048
   AM51                 NOP                                                     08267  1  01048  N
   AM52      CMSTMS     B      *&18                                             08268  7  01049  J01073
   AM53                 WCP    PMESMZ             TYPE MASTER TAPE MESSAGE      08275 10  01056  M%T008342W
   AM54                 BAL    *-16                                             08285  7  01066  R01056M
                                                                                                    G
   AM55                 BCE    CWTLAD,CPHTPA&2,1  GO IF MODIFYING FROM CARDS    08292 12  01073  B01109010991
   AM56                 BCE    CWTLAD,CPHTPA&2,Z                                08304 12  01085  B01109010992
   AM57      CPHDEQ     EQU    *                                                08316     01097
   AM58      CPHTPA   * RWU    11                                               08316  5  01097  U%U1U
   AM59               * BAL    *-11                                             08321  7  01102  R01097M
                                                                                                    G
   AM60      CWTLAD     B      PWTLOD             GO RWD-WT LOAD PROG ALL OUTPUTS 08328 7  01109  J08361
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
AM62                8      CPHASE                          08335    7  01116  J00476
AM63      PHESMZ    CCORG  *                               08342       01123
AM64                DCW    @XX-NEW MASTER TAPE@,G          08359   18  01140
AM65      CPHTP8    CCORG  *                               08361       01142
AM66                ORG    CPHTP8                                      08361
AM67      ************************************************************
AM68      *REWIND AND WRITE LOAD PROGRAM ON OUTPUT DRIVES.
AM69      PWTLCD    SBR    PDCN&5          SET EXIT                     7  08361  G085428
AM70                CW     PREND&1         FIND ADDRESS                 6  08368  ¤08402
AM71                SBR    PWBAR&5         STORE IT                     7  08374  G085118
AM72                MLCWA  PRWD&5,PWT&5    MOVE REWIND INSTRUCTION     12  08381  D0854908494X
AM73                MLCWA                                               1  08393  D
AM74                B      PFIN            GO TO REWIND ALL OUTPUTS     7  08394  J08426
AM75      PRENC     CW     PDCN&1          FIND ADDRESS                 6  08401  ¤08538
AM76                SBR    PWBAR&5         RESTORE IT                   7  08407  G085118
AM77                MLCWA  PWTSA&9,PWT&9   RESTORE WRITE INSTRUCTION    12  08414  D0855908498X
AM78      PFIN      SW     PRCTAB&1        FIND ADDRESS OF TABLE        6  08426  ,07993
AM79                SAR    INCEXA          STORE IT                     7  08432  G00039A
AM80      PMRC      MRC    0&INDEXA,PWT&1  MOVE CHNL INDICATOR         12  08439  D000&008490#
AM81                MRC    1&INDEXA,PWBA   MOVE STATUS INDICATOR       12  08451  D000&108499#
AM82                SAR    INCEXA          SAVE ADDRESS                 7  08463  G00039A
AM83      PMWT      MRC    0&INDEXA,PWT&3  MOVE DRIVE NUMBER           12  08470  D000&008492#
AM84                SAR    INCEXA          SAVE ADDRESS                 7  08482  G00039A
AM85      PWT       WTBW   11,LPR          WRITE TAPE                  10  08489  L%8108597W
                                                                                    G
AM86      PWBA      BA1    BERROR          BRANCH ANY ERROR             7  08499  R00306M
AM87      PWBAR     BCE    PDCN,0&INDEXA,  GO IF ALL DRIVES WRITTEN    12  08506  80853700080
AM88                BBE    PMRC,0&INDEXA,& IF ZONE BITS-GO CHANGE CHNL 12  08518  W0843900080&
AM89                B      PMWT            BRANCH TO NEW DRIVE          7  08530  J08470
AM90      PDCN      B      00000           EXIT                         7  08537  J00000
AM91      PRWD      DCW    @U%U1R@         REWIND INSTRUCTION           5  08544
AM92                DCW    @N@                                          1  08549
AM93      PWTSA     WTBW   11,LPR          WRITE INSTRUCTION           10  08550  L%8108597W
AM94      ENDCXH    ORG    *                                               08560
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   PGLIN    LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AM96     **********************************************************************
   AM97     *END OF PHASE 2 IF PHASE 3 IS TO BE RUN.
   AM98              ORG    CTBOUX                                                00777
   AM99     ENDCPH   CDORG  ENDCXH                                  08560       00777
   AN       ENCPHA * RWD    11              REWIND TAPE WITH 2&3 ON IT  08560  5 00777  U%U1R
   AN 1             * BAL    ENCPHA                                  08565  7 00782  R00777M
                                                                             G
   AN 2     ENDCPI   CDORG  *                                       08572       00789
   AN 3     ENCPHB * RTBGW  11,PPHASE       READ PHASES 2&3 INTO UPPER CORE 08572 10 00789  L%81076955
   AN 4             * BAL    BERROR                                  08582  7 00799  R00306M
                                                                             G
   AN 5              B       EPHASE         GO TO PHASE 3            08589  7 00806  J08834
   AN 6     ENCPND   CDORG  *                                       08596       00813
   AN 7     ENCSTP   DCW    aMa             STOP OVERLAY            08596  1 00813
                            G
```

```
PGLIN    LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

AN 9     ********************************************************************
AN10     * LOAD PROGRAM TO BE PUT ON THE OUTPUT TAPES AS THE FIRST RECORD
AN11              ORG    00011                                                  00011
AN12     LPR      CDORG  *                                          08597       00011
AN13              BBE    LBUT-10,00001,B                 GO IF LOAD BUTTON WAS USED 08597 12 00011 W00123000001BST
AN14              MRCW   0,LBA                           INITIALIZE READ TAPE    08609 12 00023 00000000071MT
AN15              MRCW   0,LBB                           AND STATUS              08621 12 00035 00000000088MT
AN16              MRCW   0,LBC                           INDICATORS              08633 12 00047 00000000095M
AN17              MLCS   2,LRT&1                                                 08645 12 00059 D00002000793G
AN18     LBA      BA1    LRT                             TURN OFF I/O INTERLOCK  08657  7 00071 R00078M
AN19     LRT      RTBGW  10,FIELD                        READ FIRST PROGRAM      08664 10 00078 L%B0001000$
AN20     LBB      BEX1   LRT,3                           BRANCH IF NOT READY OR BUSY 08674 7 00088 R000783G
AN21     LBC      BA1    *&1                             TURN OFF INTERLOCK      08681  7 00095 R00102M
AN22              MLCWA  LRT&10,332                      SAVE STATUS INDICATOR   08688 12 00102 00008800332X
AN23              MLCWA  LRT&9,331                       SAVE READ INSTRUCTION   08700 12 00114 00008700331X
AN24              B      PCPU                            GO TO CC01              08712  7 00126 J02000
AN25     LBUT     BA1    *-9                             TURN OFF INTERLOCK      08719  7 00133 R00130MG
AN26     LRTB     RTBGW  10,FIELD                        READ FIRST PROGRAM      08726 10 00140 L%B0001000$
AN27              BEX1   *-26,3                          BRANCH IF NOT READY OR BUSY 08736 7 00150 R001303G
AN28              BA1    *-9                             TURN OFF I/O INTERLOCK  08743  7 00157 R00154M
AN29              MLCWA  LRTB,332                        SAVE STATUS INDICATOR   08750 12 00164 D0014000332X
AN30              MLCWA  LRTB-1,331                      SAVE READ INSTRUCTION   08762 12 00176 00013900331X
AN31              B      PCPU                            GO TO CC01              08774  7 00188 J02000
AN32              H                                      TERMINATE BRANCH OP     08781  1 00195 .
AN33              DC     @12124248488888-8- - 1 @  FLOATING BIT                 08802 21 00216
AN34              DC     @TS$GF$STTS$FG$STTS$GF@  FLOATING NOT BITS              08823 21 00237
AN35              DCW    @1@                             WORD MARKED BITS        08824  1 00238
AN36              DCW    @2@                                                     08825  1 00239
AN37              DCW    @4@                                                     08826  1 00240
AN38              DCW    @8@                                                     08827  1 00241
AN39              DCW    @8@                                                     08828  1 00242
AN40              DCW    @-@                                                     08829  1 00243
AN41              DCW    @ @                                                     08830  1 00244
AN42              DC     @S@                             WORD SEPERATORS         08832  2 00246
AN43              DCW    @M@                                                     08833  1 00247
```

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   PGLIN    LABEL     OPCOD  OPERAND                                    CT  AOORS  INSTRUCTION

   AN45     ********************************************************************
   AN46     *PHASE 3 STARTS HERE.  PHASE 3 IS THE PROGRAM EDIT PHASE. PHASE
   AN47     *3 DUPLICATES SHORT MEMORY DUMP PROGRAMS FROM THE NEW MASTER TAPE
   AN48     *CREATED BY PHASE 2 ONTO THE NEW OUTPUT TAPE. THIS NEW OUTPUT
   AN49     *TAPE CONTAINS ONLY THOSE PROGRAMS APPLICABLE TO A SPECIFIC
   AN50     *SYSTEM AS DETERMINED BY PHASE 3 FROM THE MACHINE CONFIGURATION
   AN51     *CONTROL CARDS ON THE NEW MASTER TAPE.
   AN52     EACEPT    EQU    ERELPR            ACCEPT ADDR TO PROG RELOCATE
   AN53     ERJECT    EQU    CPHASO            REJECT ADDR TO READ BUFFER
   AN54     ERESLT    EQU    CASTER            EDIT RESULT CHARACTER
   AN55     EINCDO    EQU    EINPUT
   AN56     EPHTRX    CORG   *                                    08834     00248
   AN57               ORG    EPHTRX                                         08834
   AN58     ********************************************************************
   AN59     *OVERLAY PHASE 2 WITH PHASE 3 SECTIONS.
   AN60     EPHASE    MLCA   EOUTPT,PRDTAB&2   SET UP PHASE 3 OUTPUT TABLE    12  08834  009029079947
   AN61               B      PWTLOO            GO RWD/WRT LOAD ON OUT 1       7  08846  J08361
   AN62      ESPASO * DCW    @U%U1A@           SPACE OVER LOAD PROGRAM        5  08853
   AN63               DCW    @N    @             ON OUTPUT 2 IF MULTI PHASE   5  08862
   AN64             * BAI    BERROR              NO SPACE IF SINGEL PHASE EDIT 7  08863  R00306M(G)
   AN65               MRCWG  EINDEX,ERELIN     OCCUPY 00025-00305             12  08870  009052000081(O)L
   AN66               MRCWG  EDMP,ENEWDP       OCCUPY 00508 UP                12  08882  009347005081(D)L
   AN67               MLCS   EINPUT,CPHASD&1   READ INPUT                      12  08894  D09049004773
   AN68               MLCS   EINPUT,EINRWU&1   REWIND INPUT                    12  08906  D09049006463
   AN69               MLCS   EINPUT&1,CPHASD&10  READ INPUT                    12  08918  009050004863
   AN70               MLCS   EINPUT&1,CPHASD&17  READ INPUT                    12  08930  009050004933
   AN71               MLCS   EINPUT&1,EINRWU&5   REWIND INPUT                  12  08942  D09050006503
   AN72               MLCS   EINPUT&2,CPHASD&3   READ INPUT                    12  08954  009051004793
   AN73               MLCS   EINPUT&2,EINRWU&3   REWIND INPUT                  12  08966  009051006483
   AN74               CW     EDIT&1,ECHWTM&1                                  11  08978  ¤0005600629
   AN75               SAR    CPHASO&29                                         7  08989  G00505A
   AN76               SBR    CPHASO&22                                         7  08996  G00498B
   AN77               WCP    PMESMX                                           10  09003  M%T009030W
   AN78               BAI    *-16                                              7  09013  R09003M(G)
   AN79               B      CPHASE            GO START PHASE 3 EDIT          7  09020  J00476
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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
   AN81      EOUTPT     DCW    a%R1a              PH 3 OUTPUT-OUT 1              3  09029
   AN82       PMESMX    DCW    aXX-NEW EDITED TAPEa,G                           18  09030
   AN83       EINPUT *  DCW    a%R1a              TAPE DRIVE FOR PHASE 3 INPUT   3  09049
   AN84      ************************************************************
   AN85      *PHASE 3 SECTIONS TO OVERLAY PHASE 2 FOR PHASE 3 OPERATION.
   AN86      ERELIN     ORG    00C08                                                00008
   AN87      EINDEX     CCORG                                                09052    00008
   AN88      ECNSTT     DCW    a8J242a            01242 & IX REG 6 ZONES    09056  5 00012
   AN89      ERSTRT     CCORG  *                                            09057    00013
   AN90      ERSTBA     DCW    a a                BA OP CODE                09057  1 00013
   AN91                 RTBGW  10,00011           RESET & START OP          09058 10 00014  L%B0000111$
   AN92                 DCW    a*a                TERMINATE & STOP MOVE     09068  1 00024
   AN93                 DCW    a01403a            IX 1 FOR CHN3             09073  5 00029
   AN94                 DCW    a01346a            IX 2 FOR CHN2             09078  5 00034
   AN95                 DCW    a01460a            IX 3 FOR CHN4             09083  5 00039
   AN96                 DCW    a0C000a            IX 4 FOR IO ERR & OTHER   09088  5 00044
   AN97                 DCW    a0C000a            IX REG 5 FOR GENERAL USE  09093  5 00049
   AN98                 DCW    a01256a            IX 6 FOR SYS1 & CHN1      09098  5 00054
   AN99      ************************************************************
   AC        *FIND & STORE IN X1 THE LEFT ADDRESS OF THE LEFT BLOCK.
   AC 1      EDIT       ZA     ECNSTT,X4          SET BLOCK ADDRESS COUNT 01242 09099 11 00055  &0001200044
   AC 2      EDITA      A      ESCWRT,X4          SUBTRACT 3 FROM X4        09110 11 00066  A0060400044
   AC 3                 BW     EBLANK,3&X4        GO WHEN FOUND             09121 12 00077  V0009600*031
   AC 4                 B      EDITA                                        09133  7 00089  J00066
   AC 5      ************************************************************
   AC 6      *EXIT IF NO CONDITIONS.
   AC 7      EBLANK     BBE    EACEPT,TOPTHO,-    B BIT IN 01249-ACCEPT UNCOND. 09140 12 00096  W0050801249-
   AC 8                 ZA     *-10,ERESLT        SET RESULT CHARACTER TO &0 09152 11 00108  &0010800507
   AC 9                 ZA     *-10,ERSULT        SET RESULT STORAGE TO &0  09163 11 00119  &0011900998
```

```
   PGLIN    LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
   AC11     ********************************************************************
   AC12     *DETERMINE SECTION SIGN.
   AC13     ESCTCN    CW     EBLOCZ&1,ESINSW    ASSUME OR CONDITION        09174 11 00130  ¤0025400228
   AC14               SAR    ESIGNE&5                                      09185  7 00141  G00220A
   AC15               BBE    *&20,4&X4,-        GO IF OR SECTION           09192 12 00148  W0017900‡04-
   AC16               CW     ENDBRX&1           SET UP FOR . CONDITION     09204  6 00160  ¤00236
   AC17               SAR    ESIGNE&5                                      09210  7 00166  G00220A
   AC18               SW     ESINSW                                        09217  6 00173  ,00228
   AC19     ********************************************************************
   AC20     *DETERMINE & SET UP FOR SIGN OF THIS BLOCK.
   AC21               CW     ESWCHX             CLEAR SWITCH X             09223  6 00179  ¤00749
   AC22     EBLOCK    S      ESCWRT,X4          ADD 3 TO BLOCK ADDRESS     09229 11 00185  S0060400044
   AC23               CW     ETRYGN&1           INITIALIZE ADDRESS         09240  6 00196  ¤00777
   AC24               SBR    EBCE&5             SET BCE A ADDRESS TO TRY AGAIN 09246 7 00202 G007618
   AC25               SW     EBCESW             SET TO END IF BCE NO BRANCH 09253 6 00209  ,00769
   AC26     ESIGNE    BBE    00C00,1&X4,8       GO IF NOT CHAR-A BIT IN ZONE 09259 12 00215 W0000000‡018
   AC27               NOP                                                  09271  1 00227  N
   AC28     ESINSW    B      EBLOCZ                                        09272  7 00228  J00253
   AC29     ENDBRX    CW     EBCESW,EQUICK&1    SET BCE SWITCH TO DROP THRU 09279 11 00235  ¤0076900911
   AC30               SBR    EBCE&5             SET BCE TO END IF BRANCH   09290  7 00246  G007618
   AC31     ********************************************************************
   AC32     *SET UP FOR THIS BLOCK.
   AC33     EBLOCZ    MLCS   EBLANK,EBCE        SET FOR BBE OP CODE        09297 12 00253  D00096007563
   AC34               BW     *&12,2&X4          GO IF BBE WANTED           09309 12 00265  V0028800‡021
   AC35               ZA     EALLDN,EBCE        SET FOR BCE OP CODE        09321 11 00277  &0082400756
   AC36               B      ESTDMD             GO TO NEXT SECTION         09332  7 00288  J00687
   AC37     EZFLDL    DCW    &FIELDS                                       09343  5 00299  00997
   AC38     EXBLNK    DCW    a  a                                          09345  2 00301
   AC39               DCW    aGa                STOP PHASE 3 OVERLAY       09346  1 00302
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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
AC41      ********************************************************************
AC42      *RELOCATE DIAGNOSTIC TO UPPER MEMORY TO MAKE A SHORT DUMP.
AC43      ENEWCP    ORG    BSETUP                                                 00508
AC44      EOMP      EQUR   *                                          09347       00508
AC45      ERELPR    MLNB   TOPTHO,ERELPC-3   SET TOP 1000S ADDR OF PROG  09347 12  00508  D0124900994J
AC46                ZA     ERELPC,X4         X4 TO TOP 1000S OF PROGRAM  09359 11  00520  E0099700044
AC47                ZA     ERELPC-5,X5       X5 TO TOP THOUSANDS OF MEMORY 09370 11 00531  E0099200049
AC48                C      X4,X5             IS PROGRAM LARGER THAN CORE 09381 11  00542  C0004400049
AC49                BL     CPHASE            GO SKIP THIS ONE IF YES     09392  7  00553  J00476T
AC50      ERELPA    MLCWA  0&X4,0&X5         MOVE PART OF PROGRAM UP     09399 12  00560  D00*0000**0X
AC51                SAR    X4                SET FOR NEXT MOVE           09411  7  00572  G00044A
AC52                SBR    X5                                            09418  7  00579  G00049B
AC53                C      X4,EZFLOL         IS ENTIRE PROGRAM MOVED     09425 11  00586  C0004400299
AC54                BU     ERELPA            GO IF NOT                   09436  7  00597  J00560/
AC55      ********************************************************************
AC56      *WRITE THIS DIAGNOSTIC ON AN OUTPUT TAPE.
AC57      EDUMP     EQUR   *                                          09443       00604
AC58      ESCWRT  * WTBEW  11,3&X5           DUMP FROM START OF PROGRAM  09443 10  00604  L%B100**3X
AC59              * BAL    BERROR                                      09453  7  00614  R00306M
                                                                                          G
AC60                BU     ETYPEO            GO TYPE TITLE               09460  7  00621  J00946
AC61      ********************************************************************
AC62      *WRITE TAPE MARK AND REWIND/UNLOAD ROUTINES.
AC63      PEOYEL    EQUR   *                                          09467       00628
AC64      ECHWTM  * WTM    11                WTM ON NEW WORK TAPE        09467  5  00628  U%U1M
AC65                DCW    @N    @                                     09476  5  00637
AC66                BAL    BERROR                                      09477  7  00638  R00306M
                                                                                          G
AC67      EINRWU  * RWU    11                REWIND NEW MASTER           09484  5  00645  U%U1U
AC68              * BAL    *-11                                          09489  7  00650  R00645M
                                                                                          G
AC69      PEOYEM    EQUR   *                                          09496       00657
AC70              * RWU    11                REWIND NEW EDITED TAPE      09496  5  00657  U%U1U
AC71              * BAL    *-11                                          09501  7  00662  R00657M
                                                                                          G
AC72                MRCWR  ERSTBA,000C0      SET RESET & START OP CODES   09508 12  00669  D0001300000M
                                                                                                 S
AC73                H      *-5               END OF PHASE 3              09520  6  00681  .00681
```

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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
AC86      ********************************************************************
AC87      *SET UP FOR THIS BLOCK.
AC88      ESTDMC    MLCS   08X4,EBCE811      SET BCE/BBE D MOD CHAR.       09526 12 00687  D00*00007673
AC89                MLCS   28X4              SET BCE/BBE B FIELD NUMERICS  09538  6 00699  D00*02
AC90                MLCS                                                  09544  1 00705  D
AC91      ********************************************************************
AC92      *SET BCE/BBE B FIELD FOR PROPER INDEX REGISTER.
AC93      ESETBF    MLZA   ECNSTT-2,EBCE810  SET BCE/BBE B FIELD FOR X6    09545 12 00706  D00010007665
AC94                BZN    EPREPX,28X4,      GO IF REFERENCE SYS1 OR CHN1  09557 12 00718  V0074800*022
AC95                MLZS   28X4,EBCE89       SET BCE/BBE B FIELD FOR-      09569 12 00730  D00*02007652
AC96                MLZS   *                  -X1/CHN3-X2/CHN2-X3/CHN4.    09581  6 00742  D00747
AC97      ********************************************************************
AC98      *SWITCH X.
AC99      EPREPX    NOP                      SWITCH X                      09587  1 00748  N
AP        ESWCHX    B      ETRYGN                                          09588  7 00749  J00776
AP 1      EBCE      BCE    00000,00000,M(G)  CHECK FOR CHECK CHARACTER     09595 12 00756  B0000000C000M(G)
AP 2                NOP                      SW CLR TO DROP THRU           09607  1 00768  N
AP 3      EBCESW    B      EQUICK                                          09608  7 00769  J00910
AP 4      ********************************************************************
AP 5      *END SECTION HOUSEKEEPING.
AP 6      ETRYGN    BW     *813,18X4         GO IF END OF SECT 1 OF 2      09615 12 00776  V0080000*011
AP 7                BBE    EBLOCK,X4,.       GO IF NOT END OF ALL SECTIONS 09627 12 00788  W00185C0044.
AP 8      ESECCN    BW     EALLCN,ESWCHX     GO IF SWITCH X IS SET         09639 12 00800  V00824007491
AP 9                BW     ESTACC,ESINSW     GO SET ACCEPT IF . CONDITION  09651 12 00812  V00922002281
AP10      ********************************************************************
AP11      *CHECK FOR COMPLETION OF THIS PROGRAMS EDIT.
AP12      EALLCN    BCE    EDCIDE,X4,8       GO IF NO MORE SECTIONS        09663 12 00824  B00855C0044B
AP13                MLZS   18X4,ERSULT       STORE INTER SECTION SIGN      09675 12 00836  D00*01009982
AP14                B      ESCTON            GO CHECK SECOND SECTION       09687  7 00848  J00130
AP15      ********************************************************************
AP16      *DECIDE WHETHER TO ACCEPT OR REJECT THIS PROGRAM.
AP17      EDCIDE    MLZS   ERSULT,ERESLT     SET FINAL RESULT              09694 12 00855  D00998005072
AP18                BBE    ERJECT,ERESLT,8   REJECT IF RESULT IS ZERO      09706 12 00867  W00476005078
AP19                BBE    EACEPT,ERESLT,-   ACCEPT IF B BIT IN RESULT    09718 12 00879  W0050800507-
AP20                BBE    ERJECT,ERESLT,1   REJECT IF 1 & NOT B BITS      09730 12 00891  W00476005071
AP21                B      EACEPT            ACCEPT IF 2 & NOT B BITS      09742  7 00903  J00508
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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
AP23      ********************************************************************
AP24      *END SECTION HOUSEKEEPING.
AP25      EQUICK    BK     ESTSWX,ESINSK     IF . COND,LEAVE UNACCEP TABLE  09749 12  00910  V00933CC2281
AP26      ESTACC    A      *-IC,ERESLT       SET SECTION ACCEPTABLE         09761 11  00922  A00922C0SC7
AP27      ESTSWX    SW     ESWCHX            SET SWITCH X                   09772  6  00933  ,00749
AP28                B      ETRYGN                                           09778  7  00939  J00776
AP29      ********************************************************************
AP30      *TYPE THIS DIAGNOSTICS SEQUENCE NUMBER AND IDENTITY.
AP31      ETYPEC    ZA     TOPTHO-999EX5     CLEAR SEQUENCE ZONES           09785  6  00946  E00SV2
AP32                MLCA   EXBLNK,TOPTHO-999EX5                             09791 12  00952  D00301C0SV2I
AP33      ETYPEK    MCP    PROGSC-999CX5     TYPE IT                        09803 10  00964  MXI00CSU8K
AP34                EAI    ETYPEW                                           09813  7  00974  R00964M
AP35      ETYPPC    B      CPHASE            GO GET NEXT PROGRAM            09820  7  00981  J00476
AP36      ********************************************************************
AP37      *PHASE 3 CONSTANTS AND STORAGE.
AP38      ECREL     CLORG  *                                                09827     00988
AP39                *      DCW    @CC999@    TOP THOUSANDS ADDRESS OF MEMORY 09831  5  00992
AP40      ERELPC    DCW    @CC999@    TOP THOUSANDS ADDR OF PROGRAM        09836  5  00997
AP41      ERSULT    DCW    @ @                                             09837  1  00998
AP42      EENDPH    CLORG  *                                                09838     00999
AP43                DCW    @M@        STOP PHASE 3 OVERLAY                 09838  1  00999
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   PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

   AP45      ************************************************************************
   AP46      *SUBROUTINE TO CHECK & UPDATE TAPE LEVEL.
   AP47                 @  ORG    @ENDPH@1                                          09839
   AP48      PLEVEL     @  MLNS   CIMAGE@1C,@ENDPH@9  NEW LEVEL TO LOWER PHASE 1   12  09839  D00611009711
   AP49                 @  MLNS                                                     1  09851  D
   AP50                 @  MLNS                                                     1  09852  D
   AP51                 @  MLNS                                                     1  09853  D
   AP52                 @  MLNE   PHMGMR-27,PLEVOL   ISOLATE OLD LEVEL NUMERICS   12  09854  D0766609968J
   AP53                 @  C      CIMAGE@5,PLEVOL                                  11  09866  C0C60609968
   AP54                 @  BL     PLEVMS             GO IF A CHANGE IS MISSING     7  09877  J09909T
   AP55                 @  C      CIMAGE@1C,PLEVOL                                 11  09884  C0061109968
   AP56                 @  BH     PLEVBK             GO IF THIS IS A CHANGE BACKWARDS  7  09895  J09928U
   AP57      PLEVNO     @  B      PCRCIM@25          GO READ NEXT CARD             7  09902  J06157
   AP58      PLEVMS     @  MLZS   *@1,@ENDPH@6       SET MISSING LEVEL FLAG IN 1000S  12  09909  D09921009682
   AP59                 @  B      *@13                                             7  09921  J09940
   AP60      PLEVBK     @  MLZS   *@1,@ENDPH@7       SET BACK LEVEL FLAG IN 100S   12  09928  D09940009692
   AP61                 @  B      TYPI                                             7  09940  J06087
   AP62                 @  CCW    @*LEVEL ERR@,@                                  10  09956
   AP63                 @  B      PLEVRC                                           7  09958  J09902
   AP64      PLEVOL     @  CCW    @    @             OLD TAPE LEVEL NUMERICS      4  09968
   AP65                    END    PSTART             D.E.B.     C.R.M.                    J02000
                                                                 END OF ASSEMBLY
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